DECEMBER 16, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Pilot Production
Improves Odds for Success... Page 102

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✔ Pig Iron Use Sets Record . . . Page 137

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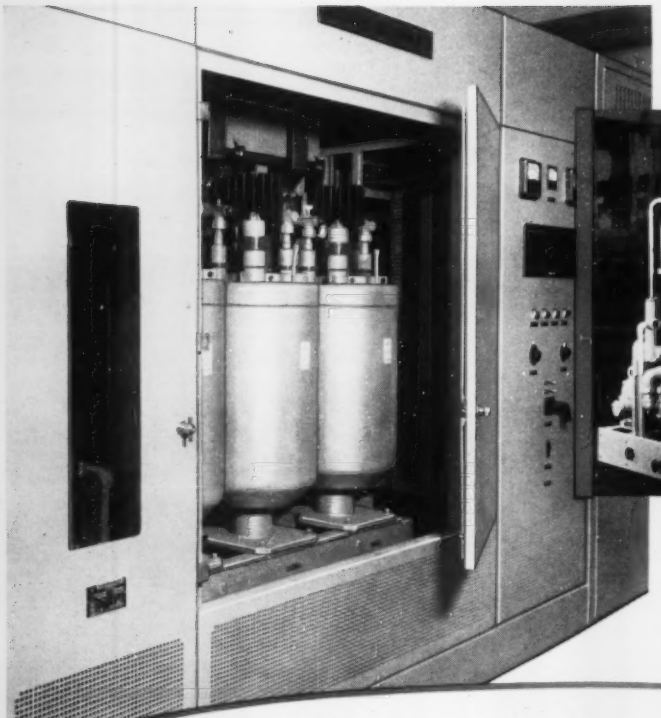
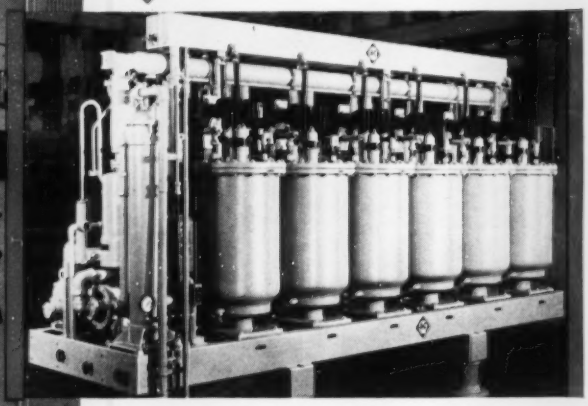


Open pumped tube unit permits easy access for inspection. Easy to recondition in field.



Enclosed sealed tube unit conserves space, cuts installation costs, eliminates need for vacuum pumping system.

ALLIS-CHALMERS

Mercury Arc Rectifiers

Pumped or Sealed? Open or Enclosed?

Here's how Allis-Chalmers can help you choose a rectifier for your job—

BOTH sealed and pump-evacuated tube rectifiers offer distinct advantages, depending upon the application. Whether your rectifier should be open or enclosed construction also depends on the application. Since Allis-Chalmers offers you a choice of sealed or pumped tubes in either open or enclosed construction, you get an unbiased recommendation, based on a study of your needs, and not on commercial expediency. And you can be sure of unsurpassed reliability and ease of operation, as proved in hundreds of Allis-Chalmers installations.

Only Allis-Chalmers Excitron Rectifiers give you all these important advantages—

- **Fixed excitation anode** does not contact mercury — is independent of level, turbulence or impurities.
- **Continuous excitation** eliminates need for reignition — pilot arc always present.
- **Grid phase control** located in clean region near anode where ion density is lowest.
- **Internal cooling system** provides high heat transfer with seamless tube coil.
- **Arc-over-free tube** eliminates arc-over danger by insulating entire arc path.
- **Enameled anode seals** provide high strength, trouble-free seal.

For detailed information on mercury arc rectifiers contact your nearest A-C office, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin, for bulletin 12B8494.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-5560

Big business under the Christmas tree

. . . and steel sheets helped to build it.

More "miles" of miniature railroad tracks run through American living rooms at Yuletide than the full-size railroads have networked across our land! This year alone, some 8½ million new model trains will be put into operation, and over $90 million spent on trains, tracks and accessories.

Some of the largest train manufacturers use Bethlehem cold-rolled sheets for a wide variety of parts and components for rolling stock and structures. And for good reason.

The makers of trains and other steel toys know they can count on Bethlehem to furnish sheets as finely finished, as easy-forming, as true to gage as any on the market. If you work with steel sheets, you'll do well to look to Bethlehem as your supplier. We'll give your inquiry our prompt attention.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Stee Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Resistance Welding Tank Cooling Fins

SCIAKY

HELPS PUT PROFIT
INTO MANUFACTURING

Sciaky Techniques Permit Adaptation of Standard Equipment to Automated Production

Automated seam welding is another Sciaky Resistance Welding Technique that can improve profit potential. And, the adaptation of *standard* equipment means that now profits increase faster because no huge expenditures are required for constructing "special" welders.

For example, the largest independent manufacturer of transformers in the world, Moloney Electric Co., St. Louis, Mo., automated the seam welding operations for their distribution transformer tanks by merely adding an automatic positioning fixture to a *standard* Sciaky Patented Three-Phase Resistance Welder.

Welding cooling fins to the tanks was originally a slow, costly arc welding job, and only one "L" shaped fin could be fastened at a time. Production requirements increased and fusion welding costs became prohibitive. As a result two standard Sciaky Longitudinal Seam Welders were installed to weld fins in "U" shaped pairs. Thus, Sciaky Resistance Welding Techniques increased production, and also improved tank design. Manual positioning of tanks and fins was adequate to meet production requirements at that time.

FIG. 2 After first weld cycle begins, electrode wheels progress down first fin as tank automatically indexes into throat of the welder. The tank then indexes radially for insertion of second fin, which is welded in position on return stroke of the tank back out of throat of the welder.

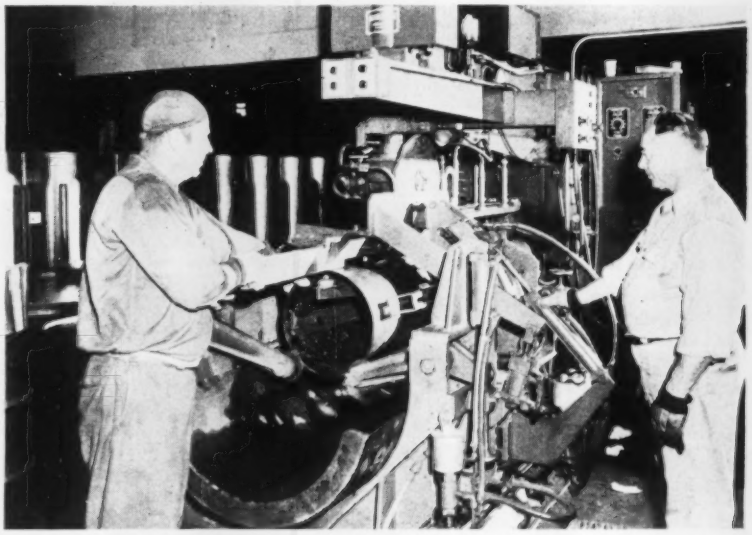


FIG. 1 After tank is loaded in automatic fixture, operator inserts first pair of "U" shaped fins in welding position. (Two brackets mounted on side of tank were joined in previous projection welding operations.)

Then, because of constantly rising materials and labor costs, Moloney faced the same "sliding profits" problem that confronts every manufacturer today. A research program was initiated to determine how to cut costs and improve manufacturing methods. This led them to study simple *automation* of the cooling fin and tank assembly operations.

Automatic Positioning Fixture

Sciaky engineers helped solve the problem with the new Sciaky Longitudinal Seam Welder equipped with special automatic fixturing. This automatic positioning fixture provides continuous, fool-proof seam welding of the cooling fins. A simple adjustment permits immediate change-over for various tank sizes, as well as radial spacing of fins.

This is how the *standard* Sciaky welder with automatic positioning fixture cuts manufacturing costs and increases production—all three operations are performed in one cycle . . .

(1) The machine welds one pair of cooling fins to the tank as it indexes into throat of welder.
(2) Positioner then indexes tank radially for the next seam welding operation.
(3) On return stroke, the machine seam welds the second fin.

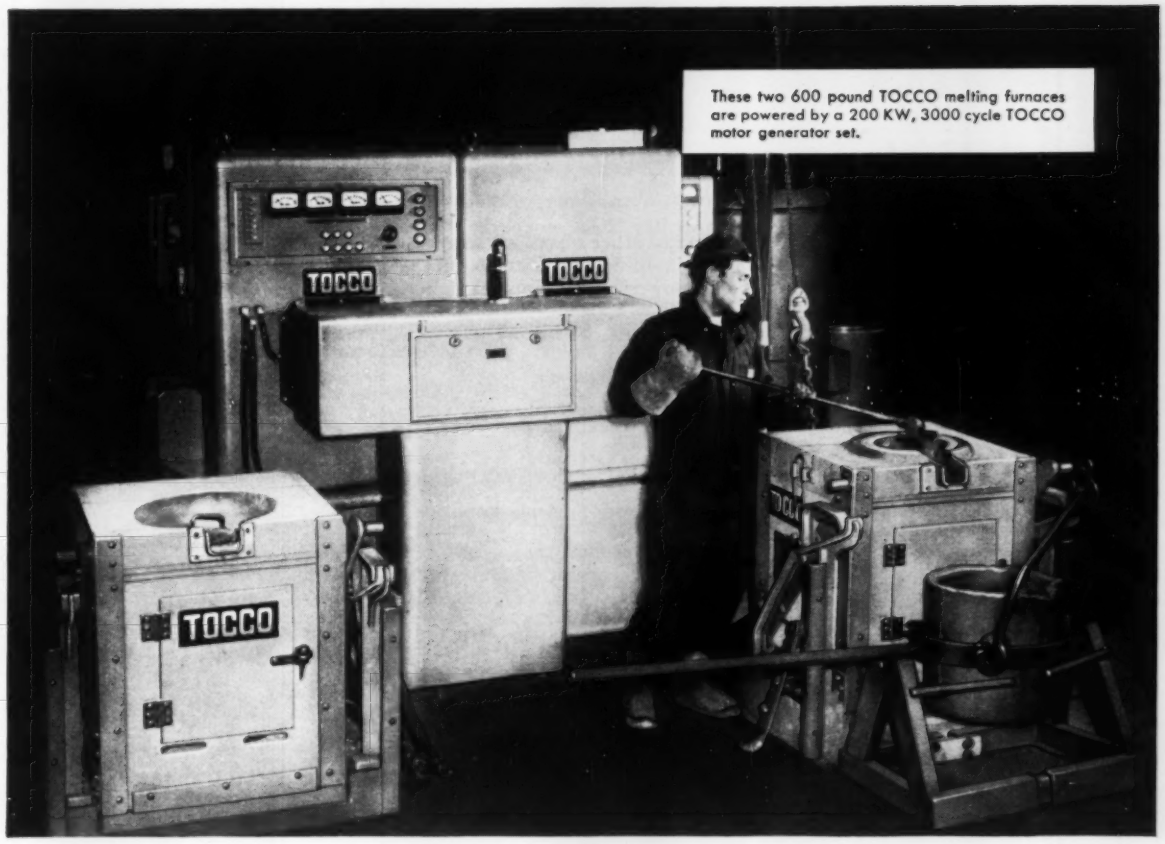
Results

The Sciaky Patented Three-Phase Resistance Welder with automatic positioning fixture and two operators DOUBLED production over the previous method when two welders and four operators were required. The two previous machines and the extra two men were absorbed into other resistance welding operations.

Information Available

Case histories outlining the successful use of Sciaky Resistance Welding Techniques are available on request. Specific recommendations will be furnished on receipt of an outline of your requirements.

Write today, mentioning the information you would like to receive. No obligation. Sciaky Bros., Inc., 4909 W. 67th St., Chicago 38, Illinois. POrtsmouth 7-5600. 63D



These two 600 pound TOCCO melting furnaces are powered by a 200 KW, 3000 cycle TOCCO motor generator set.

TOCCO* Induction Melting "Delivers"— In Two Days Instead of Two Months!

Casting backlogs at Commercial Shearing and Stamping Co. in Youngstown, Ohio, used to lag from 8 to 10 weeks behind production schedules. By installing four 600 pound TOCCO melting furnaces this firm upped daily melting capacity to 28,000 pounds. Now orders can be shipped in 48 to 72 hours.

In a foundry occupying less than 8000 square feet of space, production of castings jumped between 40% and 50%; tensile strength of alloy castings was boosted from 35,000 to 50,000 p.s.i. Substantial savings in the cost of castings have resulted. Moreover, with precision casting and molding on a push-button basis, many former drilling and roughing operations were completely eliminated.

Many firms have discovered that TOCCO Induction Melting insures maximum quality control, increased volume and lower operating costs—foundry premiums directly linked to TOCCO's rapid melting, simplicity of operation, low alloy loss, constant burn off and pinpoint quality control.

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TOCCO

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Please send copy of "The Case for TOCCO Induction Melting."

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THE

A B C

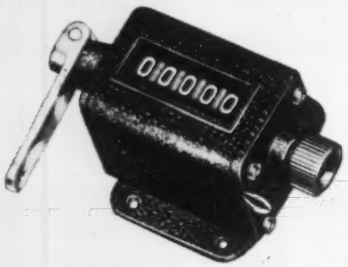
OF

1 2 3

Why is COUNTROL

important in every business today?

Countless times a day, every business needs to know "how many? . . . how much? . . . how far? . . ." and many other questions that can be answered only by facts-in-figures. But how to get these figures . . . from so many different machines, processes, operations and systems? Veeder-Root Counters are doing it every day, by means of:



MECHANICAL COUNTING

Small Resets count strokes, turns, or pieces . . . are used by thousands for moderate duty in parts inspection, quality control, conveyors, machine tools, light presses, etc.

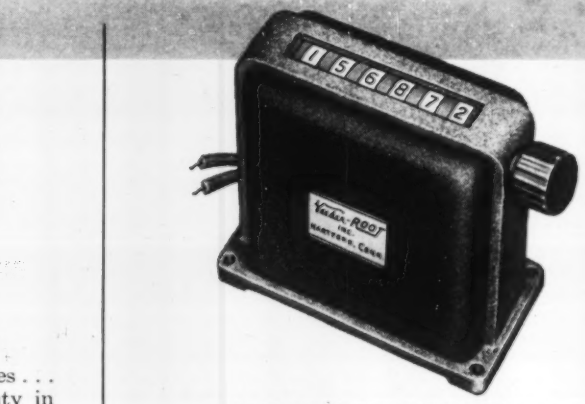
HAND COUNTING

Where objects or units cannot be counted electrically or mechanically, hand-operated counters like this Hand Tally do the job. For instance, quick spot checks of production or performance, traffic count, inventory, etc. Fits palm of hand, counts one for each pressure of thumb lever, resets to zero by turning knob.

Insist on Standard

VEEDER-ROOT COUNTERS

from your Industrial Supply Distributor



ELECTRICAL COUNTING

These remote-indicating counters bring your production machines as close as your office wall. AC or DC, they can be connected in series with any simple switch, and will transmit production figures *instantly* over any distance. May be panel-mounted in groups.

CONTROLLING

Set it for the exact number of turns, pieces, or operations required . . . and this Predetermining Counter will control the run *exactly* . . . preventing over-runs and shortages. When the predetermined number is reached, counter will light a light, ring a bell, or actuate a stop-motion.

IN SUM: *If it can be counted or controlled . . . count on Veeder-Root to do it. Get in touch with your Industrial Supply Distributor for standard counters for application to your production machines and processes. And get in touch with Veeder-Root for counters to be built into original equipment.* **Veeder-Root Inc., Hartford 2, Connecticut.**

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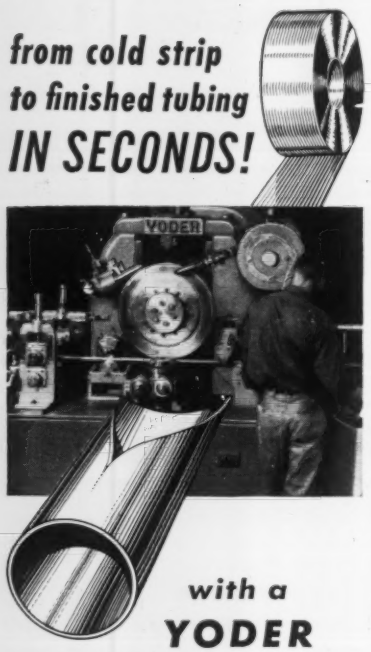
from cold strip to finished tubing
IN SECONDS!



with a YODER ELECTRIC-WELD TUBE MILL

One of the fastest . . . and one of the least expensive . . . methods of making steel tubing is with a Yoder Electric-Weld Tube Mill. The Yoder method eliminates the need for time-consuming heat treatments and costly conditioning furnaces for most tube needs. Scrap losses, too, are far lower than any other method . . . usually less than 2%.

The Yoder Type-M Mill shown above is operated by one man and a helper. Coiled strip on this mill is continuously cold-roll formed, welded and cut to required lengths in a matter of seconds . . . at speeds up to 340 f.p.m. The quality of the resulting tube is *constantly* better than the requirements of commercial standards. This is one of many reasons why manufacturers and users of tubing the world over are using more Yoder mills than all other makes combined.

If your business requires pipe and tubing, ferrous or non-ferrous, in sizes from ¼-inch up to 26-inch diameter, Yoder can supply the engineering service and machines to produce it faster and better for less! For complete details, write for the Yoder Tube Mill Manual. It's yours for the asking.

THE YODER COMPANY
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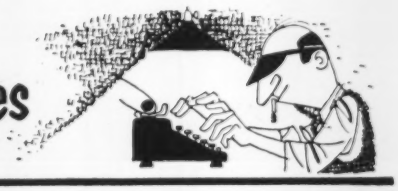
ENGINEERING **YODER** MANUFACTURING
PIPE AND TUBE MILLS
(ferrous or non-ferrous)

behind the scenes



Goblins from Albion

In the early days of World War II, news came from England bolstering our belief that man is fundamentally as pagan as his remote ancestors. Primitive man, in all ages, had a wonderful capacity for creating spirits. They were credited for good fortune, blamed for bad fortune, and coddled at all times. The bad spirits were a convenient out for folks who didn't care to admit that they had goofed, and that's normal for human beings; dodging the blame seems to have begun with Adam. Well, as most of you remember, the malignant spirits stirred up in England were gremlins. In the beginning, they raised hob with military aircraft; they caused rivets to pop, fuel lines to clog, weapons to jam. They spread to America and today they are as comfortably established here as the native whammy. One of their principal functions is to bedevil manufacturers, which they do by teaming up with bugs.

Bugs Are Their Business

However, just as the body has certain glands in the neck to trap and filter dangerous bacterial invaders, manufacturers have pilot plants and pilot productions to trap and filter the gremlins and bugs that threaten their wares. STEEL's story on pilot production (Page 102) suggests that the search for gremlins, undertaken before full production gets underway, will more than pay for itself. Even if you're too civilized to believe in gremlins, you'll save yourself a lot of money if you can get rid of them before they are allowed to mature. Last year, for instance, Chevrolet produced a few pilot models and was horrified to find 58 bugs in the works. The corporation made 58 changes, then went into production.

Our guess is that many important products today may have had some mighty weird things wrong with them before they were put into mass production. For example, imagine a beverage undergoing a chemical change that induces imbibers to turn cobalt blue all over!

A manufacturer's attempt to make a product produceable starts with trial lots—but why should we attempt to steal from the story? Machine Tool Editor Robert Huber, who wrote the article, can give you more information than we can. In fact, we're going to ask him about that cobalt blue business.

For Winter Reading

The accomplishments of United States Steel Corp. are as mighty as they are varied. Some persons might be inclined to point to its steel production; others, perhaps, would confess to an admiration of the fleets that haul its ore; still others, we are sure, would vote for its television hour. We feel that one of the greatest feats of U. S. Steel was the preparation and production of its price books. This set of six books, comprising 1314 pages loosely bound in blue, red, and silver binders, weighs almost as much as a vice president. The entire edition of 20,000 binders was distributed by parcel post, and the mailings were scheduled so that the books arrived in all sections of the country at the same time.

The printer, William Feather Co., Cleveland, says it was one of the biggest and most complex typesetting, printing, gathering, and mailing jobs it ever produced.

Steel prices are seldom static, and H. B. Taylor, director of the price division, and Roy Francisco and Fred Francis of the Sales Service Dept. of the American Steel & Wire Div. of U. S. Steel are thought to be burning joss sticks to ward off any untoward events that may threaten prices. Even Hercules would hate to read proofs on a new set before the old ones dried.

Down the Drain

A storm sewer in Palisades, N. J., runs toward the Hudson at an angle of 4 degrees with the horizontal. One rainy day a sewer rat fished a fragment of pastrami from the current, hopped aboard a shingle, and sailed 100 ft while gulping his lunch. By the time he burped and licked his whiskers, how far had he dropped vertically?

Shrdlu

(Metalworking Outlook—Page 53)

Plenty of push behind the punch...

MODEL 75-P Smith Air Compressor weighs only 1,450 lbs. yet delivers over 75 cu. ft. of air per minute. Compact design makes it easy to maneuver even over rough terrain, easy to tow even at high speeds. Economical to operate, too. One important reason for the low weight to output ratio: the Smith Compressor is powered by a peak efficiency Chrysler Industrial Engine—Weight: 740 lbs. Displacement: 265 cu. in. Equally important, the engine is specially built for continuous operation under extreme dust conditions. For example, hardened crankshaft, tri-metal bearings, hardened exhaust valve seats assure long life with minimum maintenance.

THE PAYOFF POWER IS CHRYSLER

CHRYSLER
INDUSTRIAL 32

in-line 6 Engine (265 cu. in. displacement) powers Smith Compressor—and many other makes of equipment in the construction and materials handling field. There are four Chrysler in-line 6s, two V-8s—ranging from 230 to 354 cu. in. displacement.

Chrysler
INDUSTRIAL ENGINES
INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION

December 16, 1957

Write Dept. D12, Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan, or see your nearest Chrysler Industrial Engine Dealer.

☐ For engineering information ☐ For descriptive literature

Name _____

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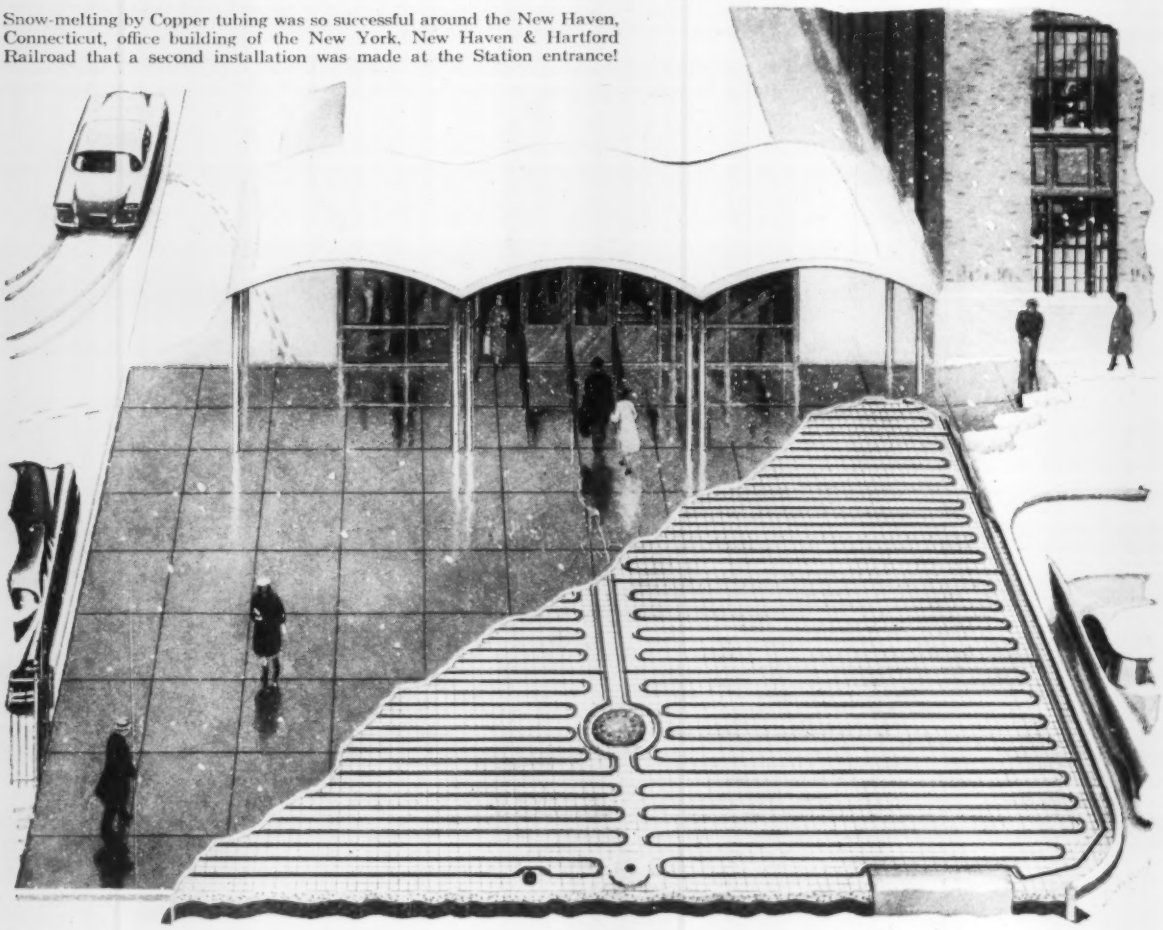
City _____ Zone ____ State _____

Snow-melting by Copper tubing was so successful around the New Haven, Connecticut, office building of the New York, New Haven & Hartford Railroad that a second installation was made at the Station entrance!



Add COPPER

...and stop shoveling snow!

In New Haven at the railroad station, snow is removed by melting. Hot water, circulating through Copper tubes embedded in the pedestrian pavement, keeps the whole area clear!

Installing a snow-melting system ... in front of a store or bank or office building or along residential sidewalks and driveways ... *is easiest with Copper.* For Copper tube comes in 60 and 100 foot lengths, minimizing the number of joints needed. These joints are quickly made too ... by soldering or brazing. Also, the flexibility of Copper tube makes most of the bending something a mechanic can do with his two hands and a knee!

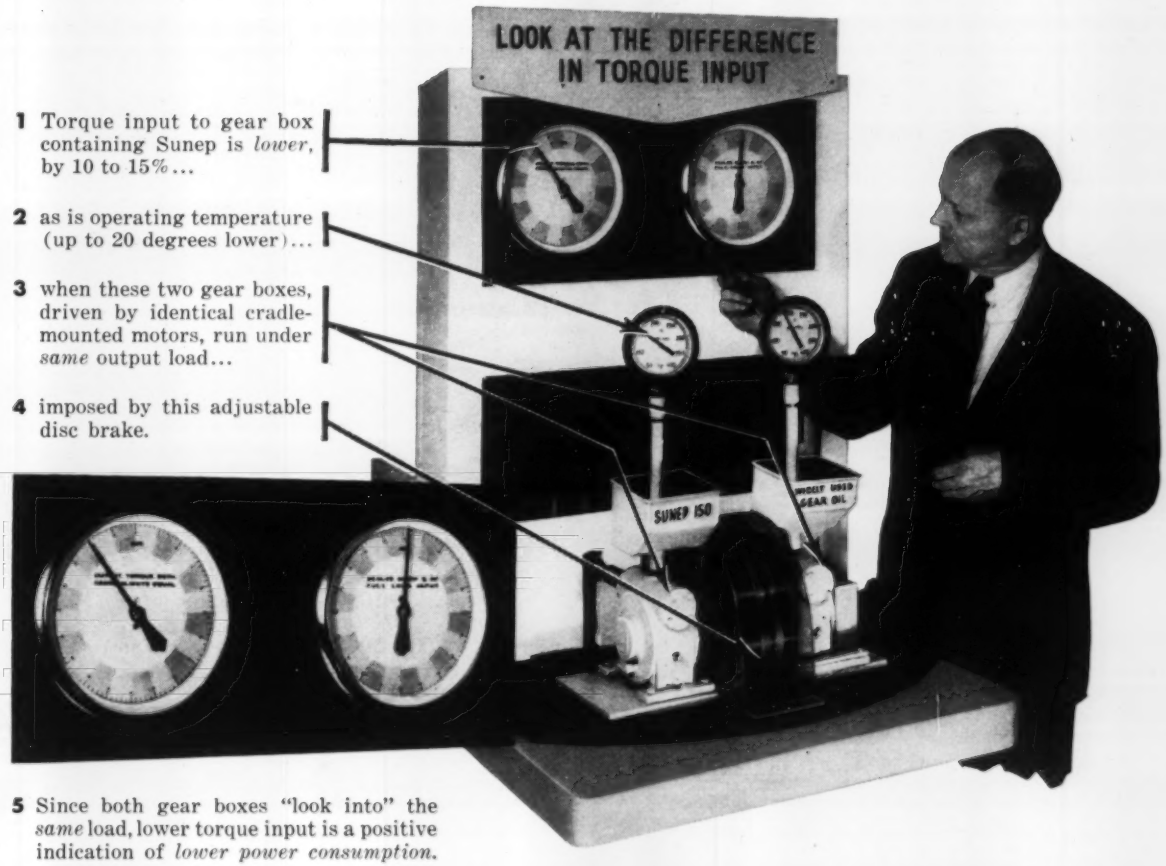
And the life of the completed, continuous heating coil? Just about *unlimited.* For Copper means virtual absence of corrosion and consequently a smooth, free flow of the heating medium at all times. No clogging with rust or other matter.

For other applications, Copper offers other superior properties, too. It's the best conductor of electricity commercially available. It is easy to machine, draw, form, stamp, polish, plate. And you can count on an ample supply of Copper to meet all your future needs.

COPPER · BRASS · BRONZE

in over 40 Standard Alloys!

For other examples of Copper tube's lower cost of installation, write the Copper & Brass Research Association, 420 Lexington Avenue, New York 17, N.Y.


LOOK AT THE DIFFERENCE IN TORQUE INPUT
1 Torque input to gear box containing Sunep is *lower*, by 10 to 15%...
2 as is operating temperature (up to 20 degrees lower)...
3 when these two gear boxes, driven by identical cradle-mounted motors, run under *same* output load...
4 imposed by this adjustable disc brake.
SUNEP 150
5 Since both gear boxes "look into" the *same* load, lower torque input is a positive indication of *lower power consumption.*

This test rig proves...

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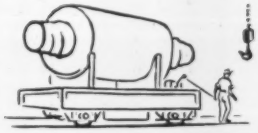
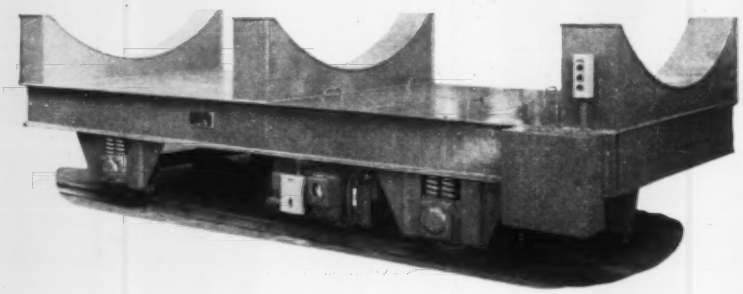


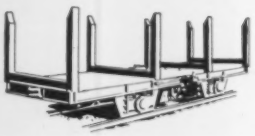
for added efficiency . . .

extra economy



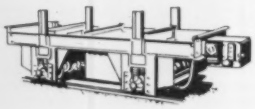
ATLAS WALK-ALONG

SAFETY-TYPE TRANSFERS



Special bed designs to cradle your load.

Single platform or double platform-operator rides.



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LETTERS TO THE EDITORS

Enjoys Editorial

Enjoyed your editorial, "1958—Year of the Marketeer" (Nov. 18, Page 107).

James W. Frasor
Manager of Sales
Industrial Trade Products
Northwestern Steel & Wire Co.
Sterling, Ill.

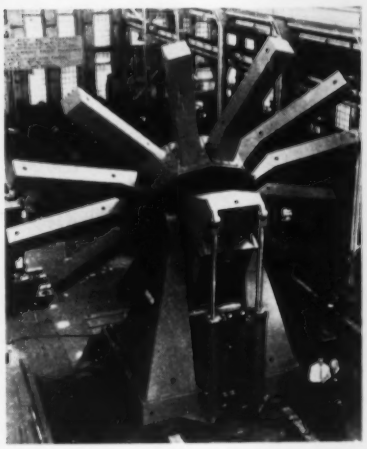
Spotlight on Problems

Congratulations on your story, "Steel Imports Aren't Breaking Records, But They Still Pain Domestic Producers" (Nov. 11, Page 161). It spotlights our problems with imported steel. Guess it is sort of like a mother-in-law living in the household. You've got to live with the situation, even if you don't like it.

I have reproduced sufficient copies for our directors and for posting on our plant bulletin boards. If possible, I'd like to have two more tearsheets for our files.

M. F. Moncrief
Manager
Advertising Dept.
Atlantic Steel Co.
Atlanta

Pandjiris Designs Positioner



The caption of the feature picture, "Huge Welding Positioner," on Page 55 of your Dec. 2 issue in no way indicates that the machine was designed and sold by us. We, in turn, sublet the job for building to Bethlehem Pacific Coast Steel Corp.

We are sorry that we were not given credit in your excellent magazine.

E. J. St. Eve
Pandjiris Weldment Co.
St. Louis

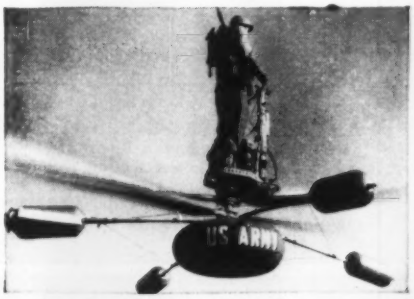
• *We, too, are sorry that our picture caption did not credit your company as the designer and seller of the equipment.*

Something About Nothing

We all enjoyed your editorial, "Parable of the Prices," in the July 15 issue (Page 51).

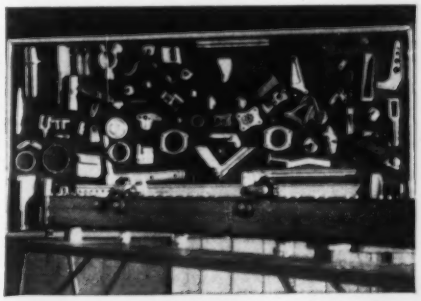
For years, we have been reading ads that say "nothing rolls like a ball."

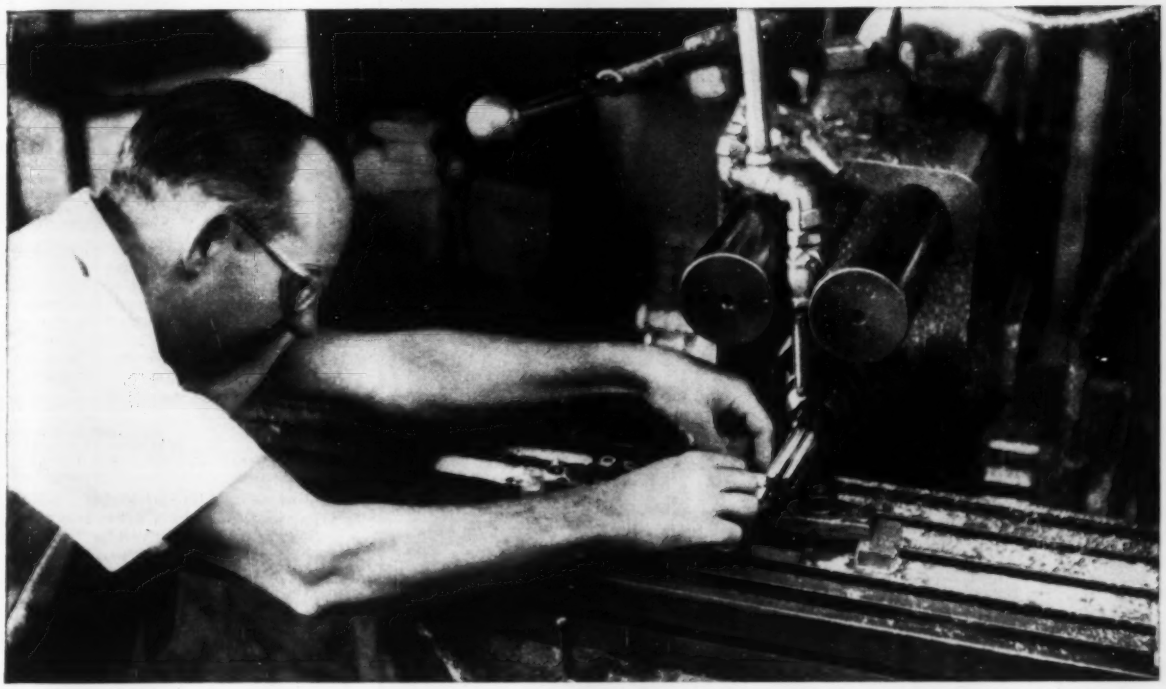
(Please turn to Page 12)



◀ **Aerocycle,** a one-man helicopter now being tested by the U. S. Army, is one of the many aircraft for which Aeroaffiliates machines precision parts.

Some Examples of Aeroaffiliates' Work. ▶ All require fine tolerances and excellent finish. All were made with the help of Cities Service Chillo Cutting Oils.





"Fine Tolerances! Excellent Tool Life! With Cities Service Chillo Cutting Oil"

In probably no other machining operation are the tolerances so fine, the requirements so demanding as in aircraft work . . . especially when it's for the U. S. Army or Air Force.

But it is on such work that Aeroaffiliates, Inc. of Fort Worth, Texas, has become famous.

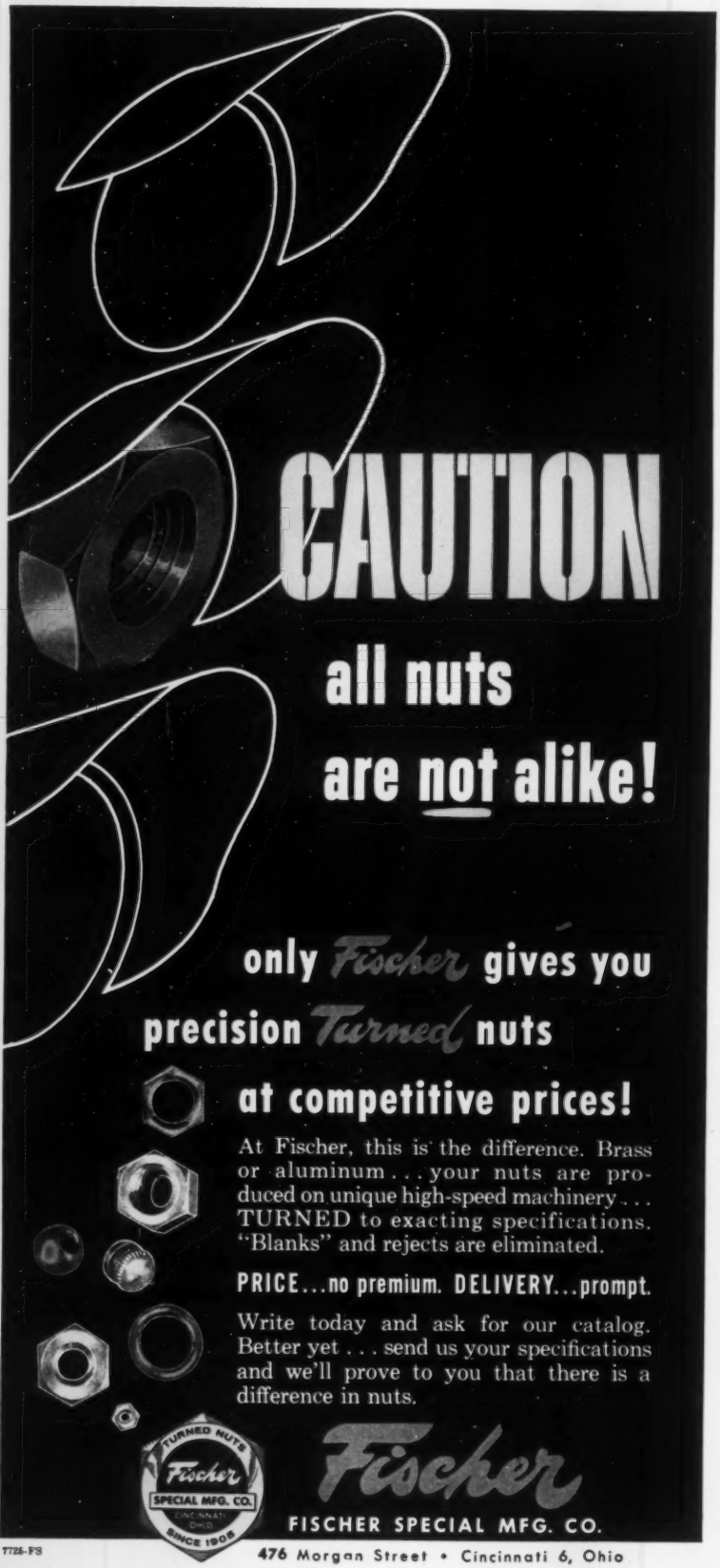
Every day, Aeroaffiliates employees must work with tolerances as fine as .0001, and their products must have an unusually good finish . . . so good that they are measured by a special gauge before the aircraft industry will accept them.

Obviously, this could play havoc with tool life . . . "but thanks to Cities Service Chillo Cutting Oils, tool life and finish are the best ever," says Aeroaffiliates. "These cutting oils are equalled only by the help we receive from the Cities Service Lubrication Engineer, a man whose knowledge and help we greatly value."

Whatever *your* type of machining operation, there's a Cities Service cutting oil tailored precisely for it . . . and a Cities Service Lubrication Engineer to help you choose it. Call him in this week. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS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At Fischer, this is the difference. Brass or aluminum . . . your nuts are produced on unique high-speed machinery . . . TURNED to exacting specifications. "Blanks" and rejects are eliminated.
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7725-FS

LETTERS

(Concluded from Page 10)

And we recently saw an ad that compared another product to "nothing."

I understand the connection implied, but the comparison still bothers me. Isn't it time someone did some explaining? In other words, write something about "nothing."

A. W. Lancaster
Engineering Research
Dorr-Oliver-Long Ltd.
Orillia, Ont.

Intrigued by Covers

Please send me a complete set of your 1957 Program for Management articles. We intend making up a booklet for internal company distribution.

I have always been intrigued by your terrific covers and would appreciate receiving some for office use.

Leo Fialcowitz
Contract Administrator
Reaction Motors Inc.
Ford Road
Denville, N. J.

Curious About Spelling

We are curious to know the reason for the spelling of "vender," in the article, "Big Job for the Missile Vender" (Nov. 25, Page 63). We have been unable to find this spelling in our dictionary and thought it might be of recent derivation.

Mrs. Gloria Charles
General Secretary
General Laboratory Associates Inc.
Norwich, N. Y.

• *The second edition of* Webster's New International Dictionary *gives two spellings, "vender" and "vendor." As a matter of style, we use "vender."*

Chemical Etching

I read your article, "Photoetching Forms Thin Parts" (Nov. 18, Page 153), with interest. The principle is similar to one which Chance Vought developed about three years ago and, after patenting, licensed out to the Turco Co. in Los Angeles. At that time, we received about 150 letters from all over the world inquiring for more details on the Chemi-cut process.

Arthur L. Schoeni
Public Relations Dept.
Chance Vought Aircraft Inc.
Dallas

Pretesting: Key to Success

I have read with interest your article, "Pretesting Ups Your Odds" (Nov. 11, Page 70) and would appreciate receiving a copy.

E. M. Myers
Vice President
F. E. Myers & Bro. Co.
Ashland, Ohio

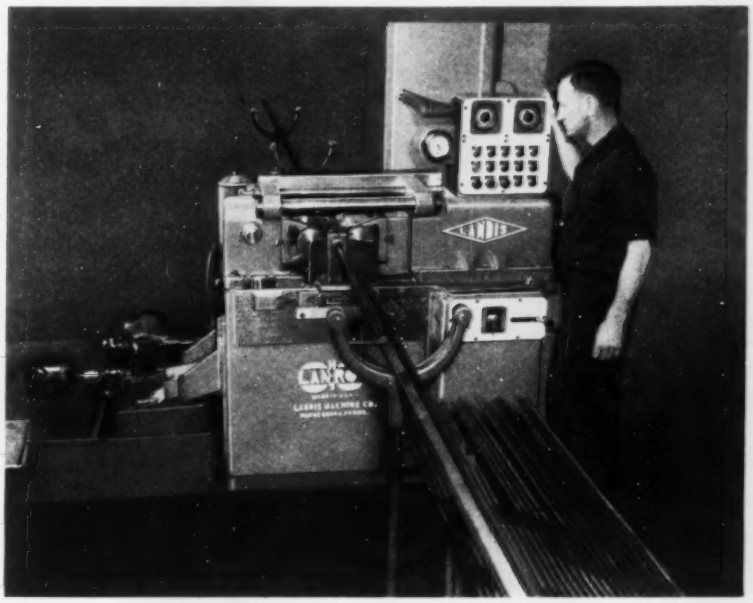
Missile Group Address

Please advise the address of the Association of Missile & Rocket Industries. It was recently mentioned in STEEL.

J. P. McGuan
Vice President-Sales
Consolidated Welding & Engineering Co.
Chicago

• *It's at 1226 National Press Bldg., Washington 4, D. C. Kendall K. Hoyt is secretary.*

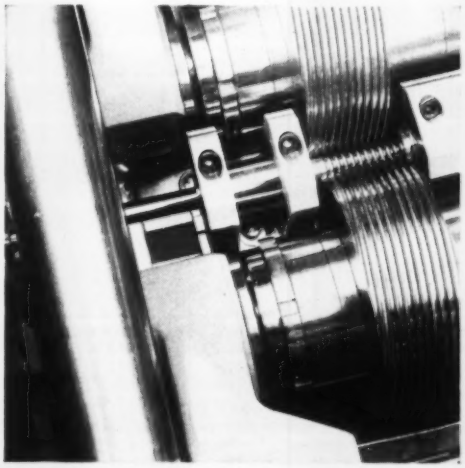
4 feet of thread *per minute*



with the LANHYROL thread rolling machine

The LANHYROL Thread Rolling Machine has shown outstanding results in output and thread quality producing 3/4" jack screws at the M & S Manufacturing Company in Hudson, Michigan.

20-foot bar lengths of C1117 steel are being formed by Thrufeed Rolling at the rate of 48 linear inches per minute. The 3/4"—6 pitch left-hand Acme threads are held within .001" on the pitch diameter throughout the entire bar length. Over 59,000 feet of thread have been produced with a set of roll dies.



In this application, the workpiece is placed in a feeding tube which is halved for loading convenience (Figure 1). It is then passed axially into ball-bearing work supports and between the rolls (Figure 2). Rolls with a throat section for progressive generation of the thread provide a self-leading action as the threads are formed.

The LANHYROL Machine is designed to produce quality threads at high rates of output. Its range and flexibility is so great that we recommend your consideration of this equipment for any job requiring precision threads of excellent finish at high production rates. Please send specifications and ask for Bulletin E-60.

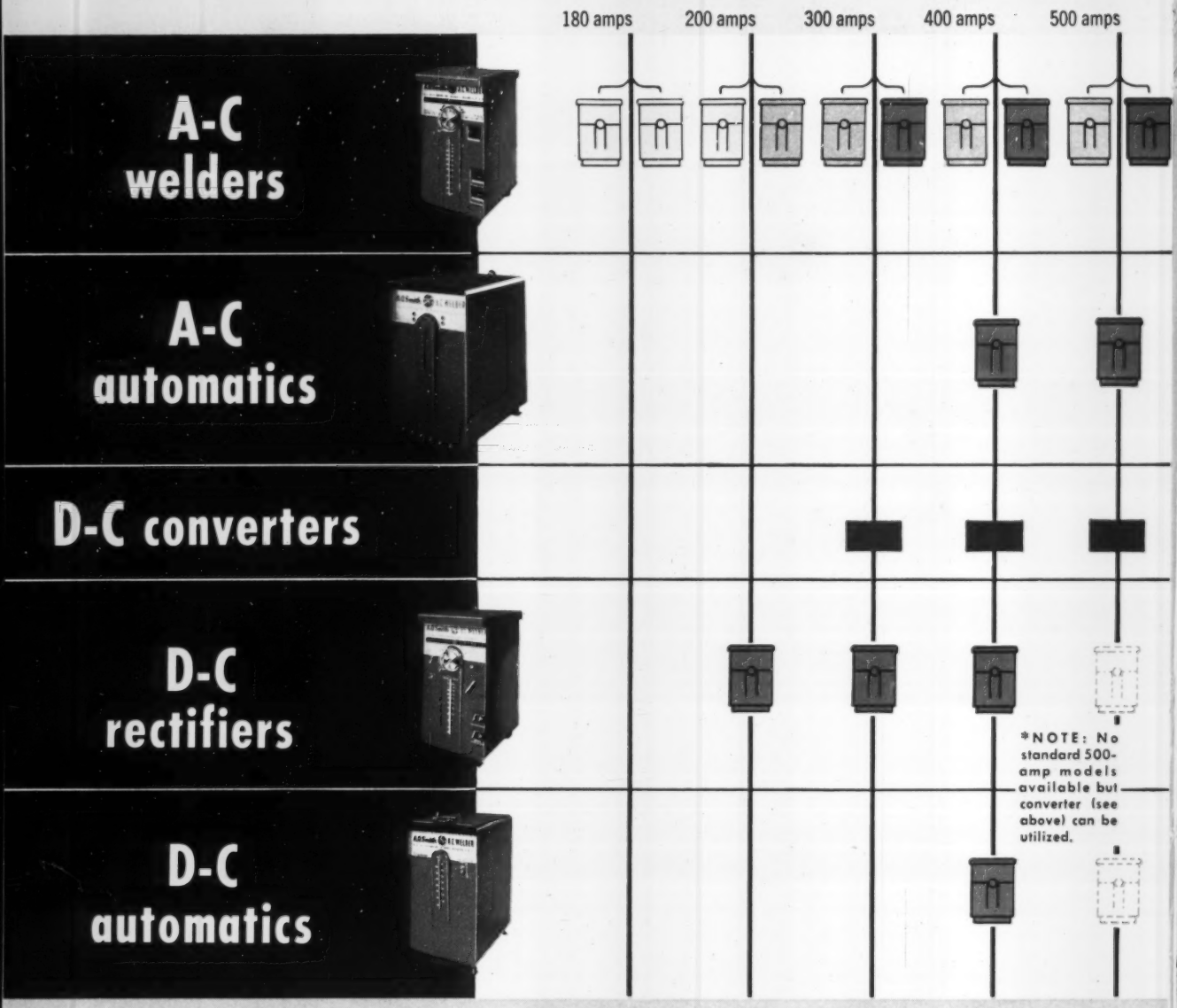
486

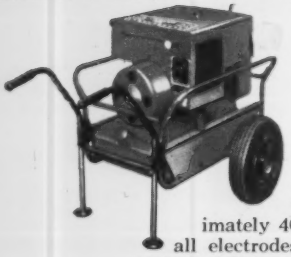
LANDIS *Machine* COMPANY

WAYNESBORO · PENNSYLVANIA

A. O. Smith lays

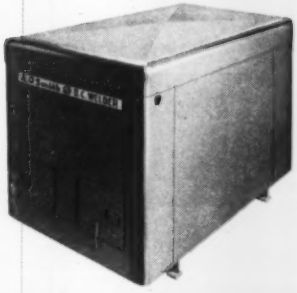
Industry's most complete choice





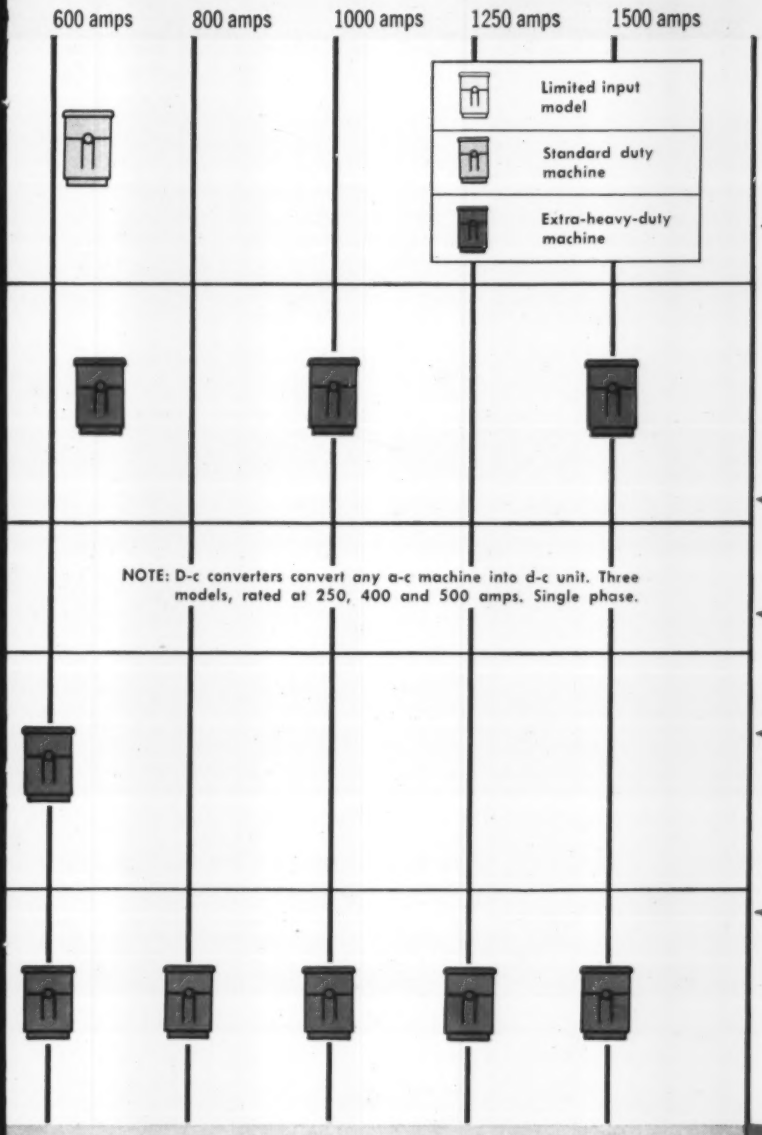
200-amp d-c gas drive — weighs approximately 400 lbs. Handles all electrodes from 1/16 to 5/32 straight or reverse polarity. Can be used as auxiliary a-c power source for lights, power tools, etc.

600 and 1500 constant potentials — 600 amp unit—0 to 45 open circuit volts with fast, easy and precise voltage control. Larger unit offers 80 open circuit volts... handles 10 to 16 welders with grids.



it on the line!

of welding machines


600 amps
800 amps
1000 amps
1250 amps
1500 amps
Limited input model
Standard duty machine
Extra-heavy-duty machine
NOTE: D-c converters convert any a-c machine into d-c unit. Three models, rated at 250, 400 and 500 amps. Single phase.

Limited input models—for farm, shop, maintenance and light-duty repair service — U-180, 180-amp welder and battery charger with dual welding range . . . U-18, same as preceding without battery charger . . . and Model "20S" dual-rated shop welder . . . 200 amps at 50% duty cycle, 295 amps at 20% duty cycle.

"Standard" NEMA a-c welders—Famed A. O. Smith Challenger models in 200, 300, 400, 500 and 650 amp ratings. Last model can be hooked up in series or in parallel. All models except 650-amp unit offer 75 open circuit volts — 650 is rated at 80 open circuit volts.

Extra-heavy-duty a-c welders—This is the elite line of a-c welders, capable of withstanding rough duty that makes other welders fail. All offer full 75 open circuit volts and many other plus features.

A-c automatics — Five basic models . . . 400, 500, 650, 1000 and 1500 amperes. Standard models include primary line contactors. Available with or without automatic/remote current control.

D-c converters — small compact packages quickly and simply convert *any* a-c machine to a d-c unit. Three models — 250, 400 and 500 amps — make *any* machine in your shop a dual welder. A-c or d-c — whatever the job requires.

D-c rectifiers — Here's the most complete line of d-c machines in the industry. All the advantages of m-g sets with none of the maintenance and parts replacement disadvantages. 80 full open circuit volts. Four choices of arc characteristics.

D-c automatics — 6 standard models covering the 400- to 1500-amp range. All feature 80 open circuit volts for more precise arc control regardless of the type of work. Like all A. O. Smith welding machines, they're qualify built in every detail . . . are easy to set up, regulate and work with. Primary line contactor is standard. Automatic/remote current control is optional.

Get the complete story on these A. O. Smith machines by contacting your "man from A. O. Smith" or write direct.

C-OMATIC — A. O. Smith's exclusive CO_2 automatic welding process. CO_2 costs only a fraction of helium or argon . . . can save thousands of dollars annually on gas costs alone. Easily set up, easy to use. Includes control console, remote-control stand, automatic head and special A. O. Smith 600-amp d-c rectifier.

C-OMANUAL — Recently introduced CO_2 hand gun version of C-OMATIC (above) puts manual welding on a virtual mass-production basis. Includes lightweight hand gun which automatically compensates for arc length . . . portable control console and special A. O. Smith d-c rectifier.

Through research A.O. Smith *. . . a better way*

A.O.Smith

CORPORATION

WELDING PRODUCTS DIVISION

Milwaukee 1, Wisconsin

A. O. Smith International S. A.,
Milwaukee 1, Wisconsin, U. S. A.

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You Can Expect More From TMI Stainless Steel and Special Alloy Tubing Because TMI Builds More Quality Into It!

METALLURGISTS, ENGINEERS, MANUFACTURERS—SPECIALISTS IN SMALL DIAMETER TUBING .050" TO .625" O.D. WITH TOLERANCES AS CLOSE AS .001" WHEN REQUIRED

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This Program includes three tested plans for leasing new Norton grinding or lapping machines. Each plan offers you the option of terminating the lease or purchasing the equipment after a stated period. Particular advantages of the Lease Program are: (1) You can acquire needed machines for just the period in which you can use them profitably, thus eliminating the obsolescence factor; (2) You can make a thorough trial of equipment without going to the expense of actual purchase, unless you decide to do so later.

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Norton machines available under the Purchase Financing Plan and Lease Program include a broad selection of the most popular types of grinders and lappers. Special arrangements will be considered whenever other Norton machines are required.

For Further Information

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"...in boom times or in bad, we have the capacity to fill your orders or we don't take them!"

NEW REPUBLIC CAPACITY NOW PRODUCING AT

BUFFALO, N. Y. — increased bar output

CLEVELAND, OHIO — two new open hearth furnaces
— increased hot and cold rolled sheets

GADSDEN, ALABAMA — two new electric furnaces
— introducing cold rolled sheets, continuous galvanized sheets, corrugated and flat
— increased hot rolled sheets

WARREN, OHIO — two new electric furnaces
— increased cold rolled, silicon and galvanized sheets

CHICAGO, ILLINOIS — increased bars, rods, wire and seamless pipe
— enlarged three electric furnaces

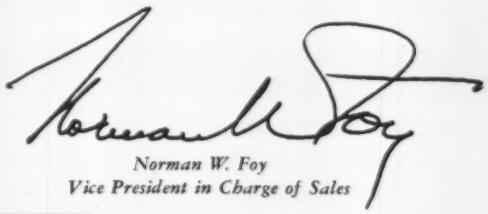
Fair treatment to our customers has been Republic Steel's firm policy over the years.

Through the postwar years, we were under severe pressure to take on new customers in many fields as well as to increase the tonnage of steel to particular categories of steel users. Republic maintained a position of fair, equitable treatment to steel users, with no preference to our own manufacturing divisions. This is a stand of which we are proud.

It has been our aim to build up our capacity so that we could provide more steel tonnage for existing customers as well as take on additional users. We have always considered our assurances of steel to customers to be real assurances, for we had to have the capacity to back up the orders. This is the reason for our substantial expansion program.

Republic's new two million ton expansion completed this month enables us to take on, with complete confidence, additional tonnages from old customers and orders from new customers.

When you place your orders with Republic —from pig iron to special finished steel, or for any of our multitude of fabricated steel products—you know that in boom times or in bad, we have the capacity to fill your orders or we don't take them!



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MOON-MAKERS*

...use CINCINNATI SHEAR

It's common knowledge that the United States is preparing to launch a "made in U. S. A." companion to Russia's Sputnik I, and join in the search for knowledge of outer space. The magnesium alloy sphere that will soon be orbiting over us was produced by Brooks and Perkins, Inc., experts in solving difficult metal fabricating problems. And the Shear that cut the blanks that became the sphere is a Cincinnati.

Brooks & Perkins states that performance of their Cincinnati has been "excellent." Their machine, like all Cincinnati Shears, combines micrometer accuracy with high speed operation. Straight and parallel cuts are consistently produced, so accurately that only a micrometer can detect any variation in width of the sheared piece.

This accuracy doesn't call for special skill or manipulation on the part of the operator. As a matter of fact, Cincinnati Shears are built to cut all thicknesses, from thin material up to capacity, ***without changing knife clearance.*** This prevents accidental damage and eliminates interruptions in production.

Dependability, equally important, is insured by Cincinnati interlocked construction. No welds are used as load supports, yet the bed is directly supported by the housings. All-steel frame members minimize deflection.

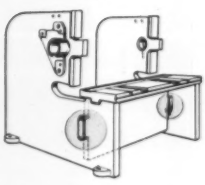
The sketches at the right show a few important features. For full information write Department C for Catalog S-7R.

*Photos courtesy of Brooks & Perkins, Inc., Detroit, Michigan

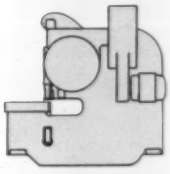
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS · SHEARS · PRESS BRAKES

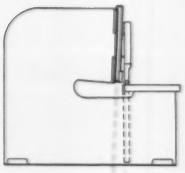
Some Important Standard Features



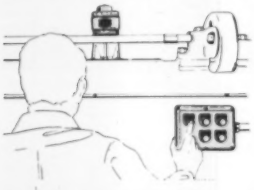
Interlocked construction means no welds used as load supports



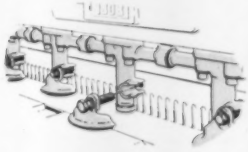
Gap frames allow shearing pieces longer than the machine



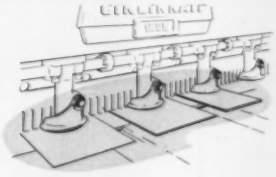
Inclined ram offsets the thrust caused by shearing action.



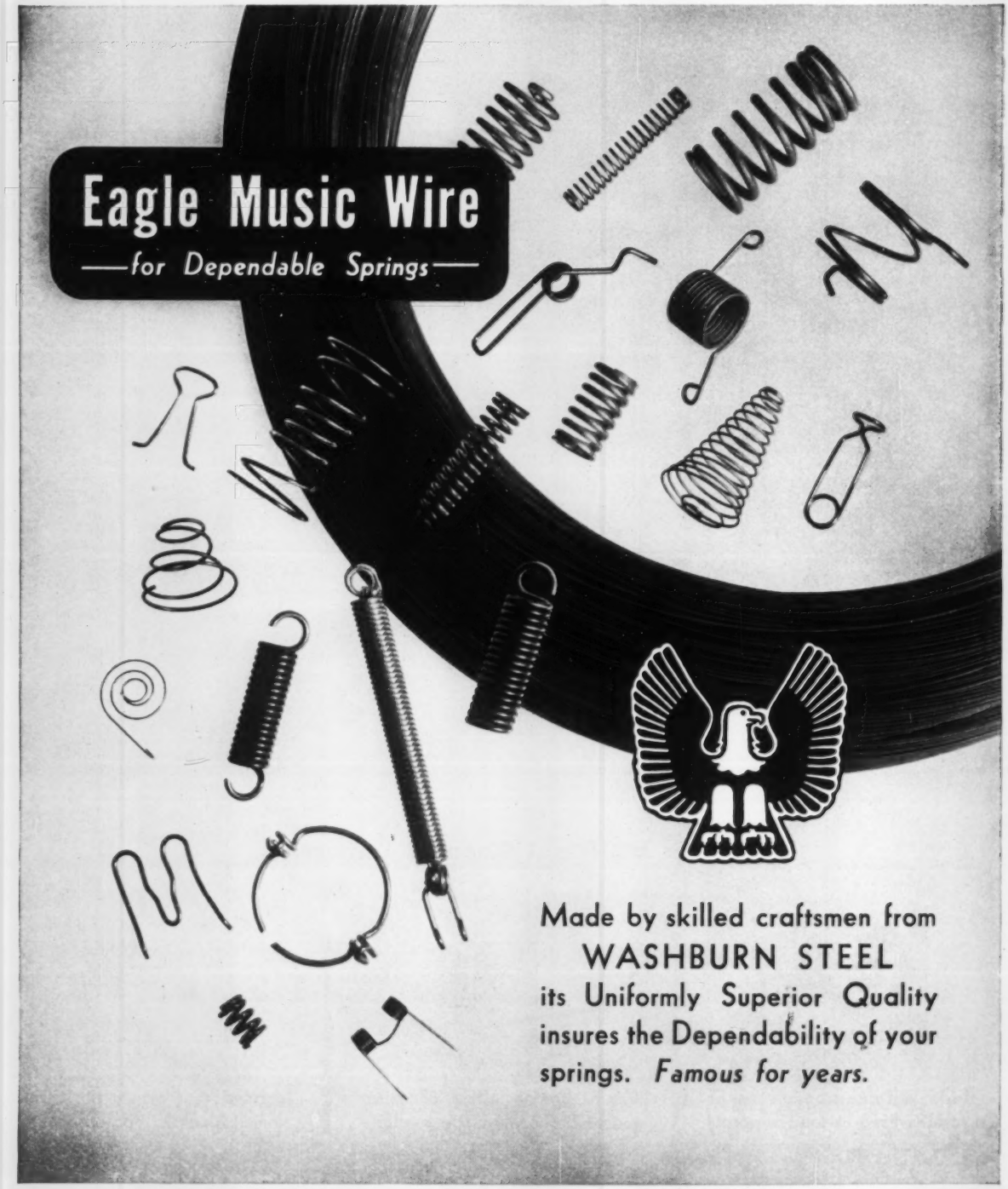
Front-controlled power back gauge is accurate, fast, convenient.



Hydraulic holdowns exert tons of pressure, insure accuracy.



Different gauges, held with same tonnage, can be cut together.



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CALENDAR
OF MEETINGS

1958

Jan. 6-8, Southern Industrial Distributors' Association: Midyear meeting, Roosevelt Hotel, New Orleans. Association's address: 1626 Fulton National Bank Bldg., Atlanta 3, Ga. Secretary: E. L. Pugh.

Jan. 13-17, Society of Automotive Engineers Inc.: Annual meeting, Sheraton-Cadillac and Statler Hotels, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Jan. 13-15, American Management Association: Special conference on developing new products, Roosevelt Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y. Secretary: Andrew P. Donovan.

Jan. 16-17, National Industrial Conference Board Inc.: General session for all associates, Hotel Commodore, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Jan. 17, Malleable Founders' Society: Semiannual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

Jan. 19-22, Institute of Scrap Iron & Steel Inc.: Annual meeting, Eden Roc, Fountainebleau, and Deauville Hotels, Miami Beach, Fla. Institute's address: 1729 H St. N. W., Washington 6, D. C. Executive vice president: Edwin C. Barringer.

Jan. 20-21, Compressed Gas Association Inc.: Annual meeting, Waldorf-Astoria Hotel, New York. Association's address: 11 W. 42nd St., New York 36, N. Y. Secretary: F. R. Fetherston.

Jan. 20-22, Truck Trailer Manufacturers Association: Annual meeting, Palm Beach Biltmore Hotel, Palm Beach, Fla. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

Jan. 20-23, American Road Builders Association: Annual meeting, Sheraton-Park Hotel, Washington. Association's address: 600 World Center Bldg., Washington 6, D. C. Executive vice president: Louis W. Prentiss.

Jan. 21-22, Steel Shipping Containers Institute Inc.: Winter meeting, St. Regis Hotel, New York. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

Jan. 26-Feb. 2, Association of Steel Distributors Inc.: Convention, Algiers Hotel, Miami Beach, Fla. Association's address: 29 Broadway, New York 6, N. Y. General counsel: Morris Rosoff.

Jan. 27-28, Industrial Heating Equipment Association: Annual meeting, Penn Sheraton Hotel, Pittsburgh. Association's address: Associations Bldg., Washington 6, D. C. Executive vice president: Robert E. Fleming.

Jan. 27-30, Plant Maintenance & Engineering Show and Conference: International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Jan. 30-31, Steel Plate Fabricators Association: Annual meeting, Roosevelt Hotel, New Orleans. Association's address: 105 W. Madison St., Chicago 2, Ill. Secretary: J. Dwight Evans.

Feb. 3-7, American Institute of Electrical Engineers: Winter general meeting, Statler and Sheraton-McAlpin Hotels, New York. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

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Typical Apex nut setter and sockets designed for use with special high-speed, resilient fasteners. Note recesses in outer walls to accommodate fastener prongs; integral magnets to help speed assembly. Openings near drive ends of sockets serve to dispel minute particles from rubber seals on fasteners.

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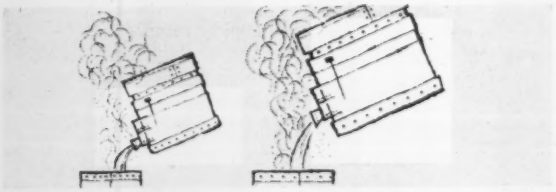
Carpenter Steel's capacity nearly doubled by adding Bridgeport, Conn. steelmaking facilities

This is Carpenter's vote of confidence in America's expanding economy

Witness with us this major step forward in our program of gearing ourselves to meet industry's growing needs for Carpenter specialty steel!

Production capacity of the Bridgeport facilities adds 84,000 ingot tons to the 86,600 tons rated annual capacity of our Reading plant. This makes available a total annual capacity of 170,600 ingot tons—practically doubling our ability to serve present customers and meet the needs of new customers.



Supported by all of Reading's research facilities and production know-how, the Bridgeport installation is operating under the name of Carpenter Steel of New England, Inc. An experienced Carpenter management and technical task force from Reading is now hard at work putting the plant back into peak operating efficiency. Many former Northeastern Steel Company employees are being trained on the spot in Bridgeport . . . other key employees are undergoing extensive training in our Reading plant.

We fully recognize our continuing obligation to all of our customers—gearing ourselves to render maximum service in a growing economy. Over and above the initial expenditure for purchase of the Bridgeport facilities, we are contemplating an expenditure of up to $6,500,000 to put the plant in proper shape.

Production will be concentrated upon electric furnace quality alloy and stainless steels.

Our purchase of the former Northeastern Steel Corporation will be of direct financial benefit to steel users in New England and the metropolitan New York area. Delivered cost of the kind of steels produced at Bridgeport will be much lower than if the mill discontinued operation.

All steels produced at Bridgeport will be sold under the supervision of The Carpenter Steel Company. Former Northeastern salesmen have now completed our regular sales training program and have been reassigned to serve the major market areas for Bridgeport products.

There will be no mass transfer of personnel, equipment or business from Reading. Since Reading has certain facilities that Bridgeport does not have, the expected increase in production at Bridgeport should result in increased employment at Reading.

We make this growth move with confidence—confidence in our loyal friends throughout industry . . . in the skill of our employees . . . and finally, in our role of serving a strong and growing industrial economy.

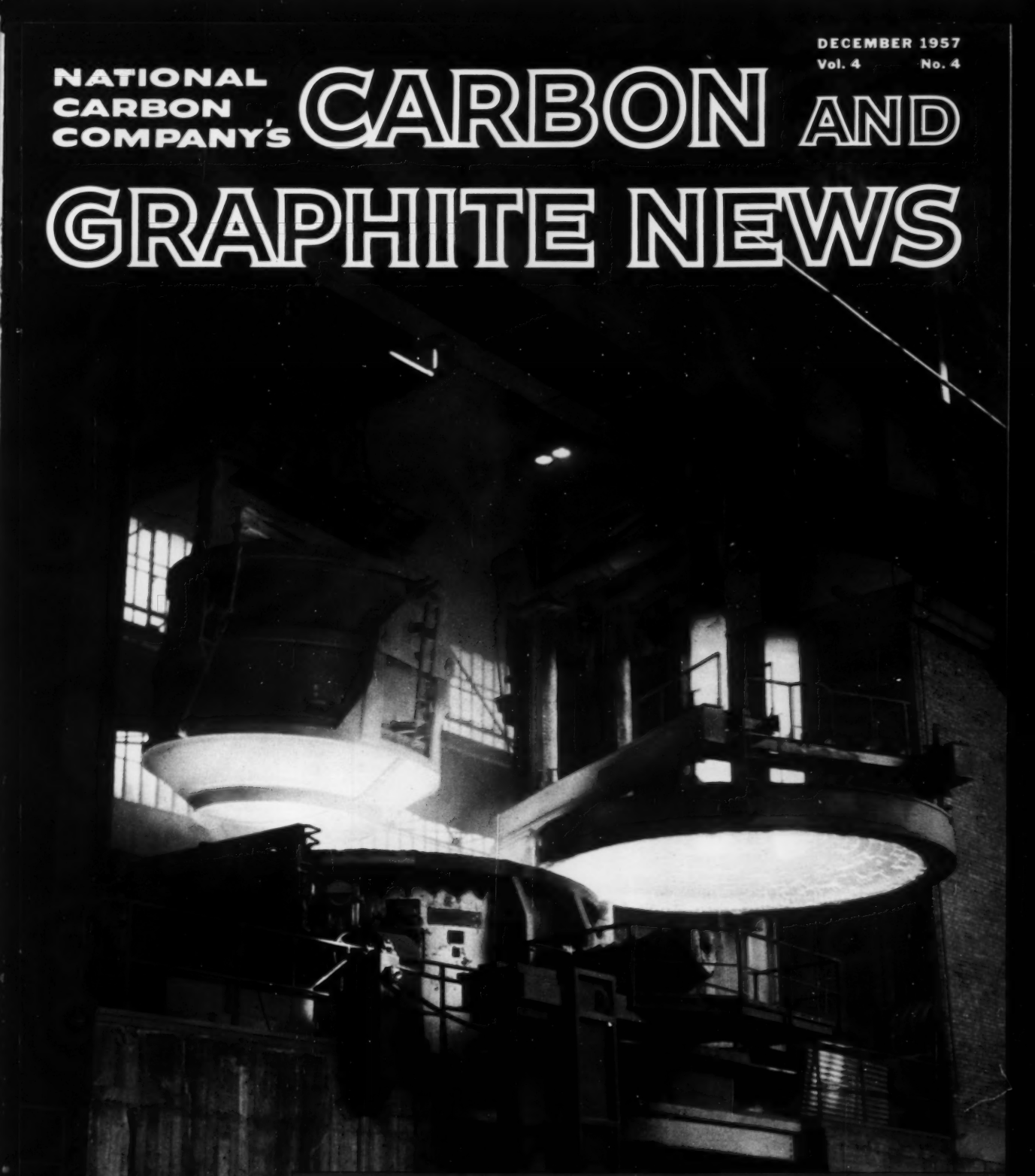
The Carpenter Steel Company, Main Office and Mills, Reading, Pa.

Alloy Tube Division, Union, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.
Webb Wire Division, New Brunswick, N. J.

DECEMBER 1957
Vol. 4 No. 4

NATIONAL CARBON COMPANY'S

CARBON AND GRAPHITE NEWS



IRON ORE REDUCTION AND THE ARC FURNACE*

By: Harry W. McQuaid

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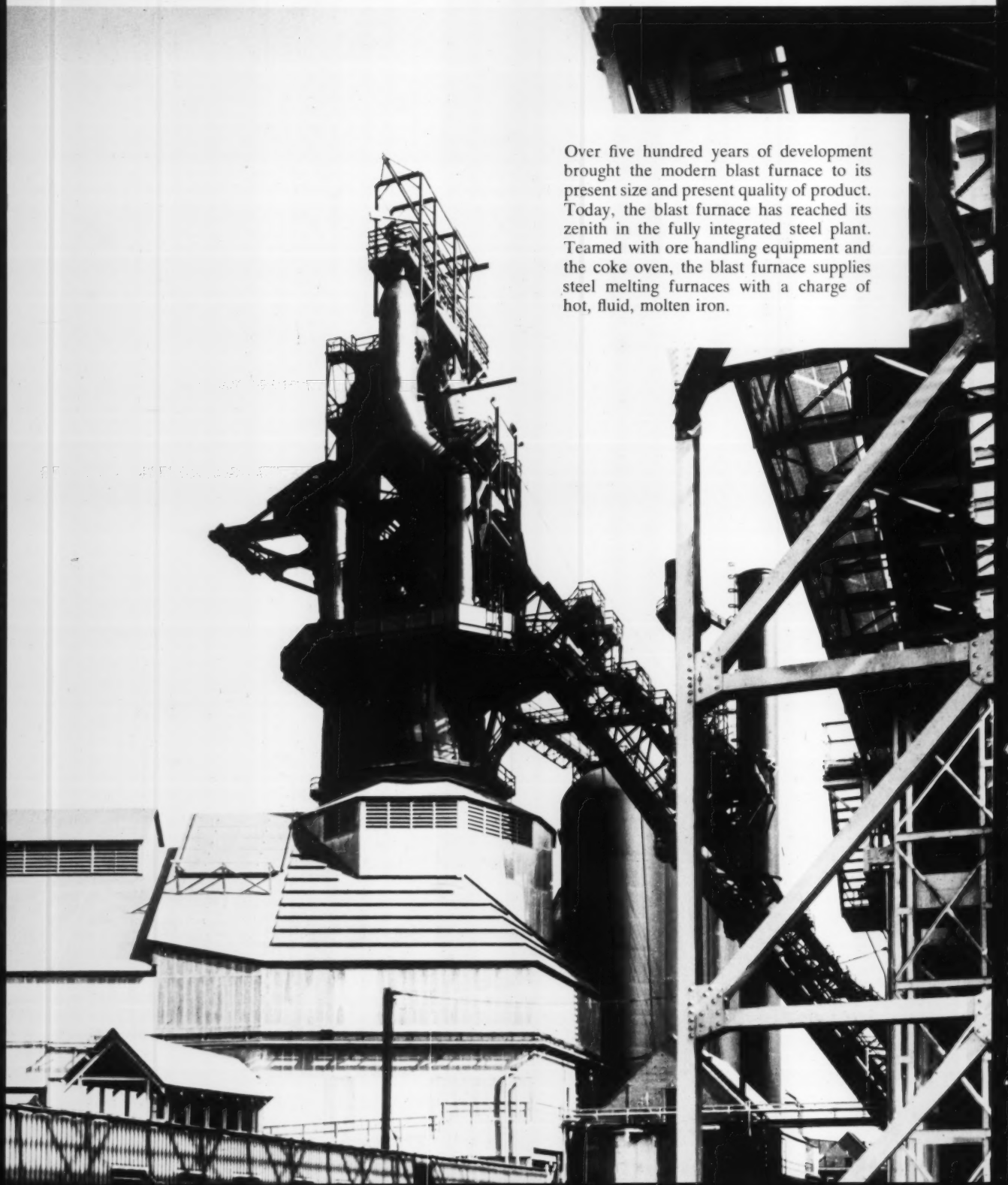
IRON ORE REDUCTION AND



Over five hundred years of development brought the modern blast furnace to its present size and present quality of product. Today, the blast furnace has reached its zenith in the fully integrated steel plant. Teamed with ore handling equipment and the coke oven, the blast furnace supplies steel melting furnaces with a charge of hot, fluid, molten iron.

THE ARC FURNACE*

BY **HARRY W. McQUAID**

Consulting Metallurgical Engineer

* Based on a paper delivered by H. W. McQuaid at the 1957 Annual Convention—Association of Iron and Steel Engineers.

Blast Furnace Limitations

Burning coke with preheated air for combustion, the blast furnace converts commercial iron oxide (ore) and an alkaline reagent (limestone) to a molten state. The reduction of iron ore by carbon monoxide which is formed by partial combustion of coke, is a relatively slow process. In addition, the process is badly handicapped by the need to melt high percentages of flux plus the melting of ore and nonmetallics under high reducing conditions.

One principal improvement which might be made in blast furnace hot metal or pig iron, would be to drop the carbon (not below 2%) and eliminate silicon and sulphur. Such a charge would be ideal for both the open hearth and the electric furnace, especially for heats which must pass cleanliness tests and be employed as an alloy steel base. Some will note that unless low sulphur fuels are used on the open hearth and in the scrap, the low sulphur, low silicon hot metal or pig is probably a wasted refinement.

However, it is my experience that a low sulphur and low silicon hot metal or pig addition, when associated with a good carbon boil, is helpful in obtaining good looking billet etches, particularly in heats on the hot side and not too fully deoxidized.

Due to the increasing height and diameter of the modern blast furnace, the need arises for an improvement in coke quality and uniformity, ore preparation, and burden uniformity. Because of this, the future development of the blast furnace seems to be becoming more uncertain every day. As a matter of fact, it has apparently reached the stage of its existence where every possible commercial step will be taken to replace it.

Objectives Of Direct Reduction

The first objective of direct reduction is to obtain relatively low cost equipment for producing commercial grades of iron to compete with cold pig iron or good grade scrap. And, to produce iron that can be somewhat independent of coke—at least high grade, special quality coke. Many processes for the direct reduction of iron ore to replace scrap or blast furnace pig iron have been proposed in the past forty years. Though many of the attempts were unsuccessful, they have been of value in indicating what should be avoided for a successful direct reduction process.

In recent years, the advances made in ore concentration and the removal of gangue material prior to reduction have greatly improved the chances of direct reduction success. For example: the preparation of finely divided concentrated ore has improved the reaction rate and the thoroughness of reduction. Also, final mixing of the highly concentrated, finely divided form with a reagent selected for oxygen removal, has been developed to assure complete reduction.

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Electric Furnace Melt Shops

Every hot metal and pig iron user in this country and Europe is patiently waiting for the time when iron ore can be directly reduced (in low cost equipment) to either liquid or solid iron. Actually the first to be attracted by such direct reduction equipment should be the electric furnace melt shop. The use of the direct reduction process to stabilize the price of scrap will be of the greatest interest to every electric furnace high tonnage operator in the country. While liquid iron would be of advantage in replacing scrap in the electric furnace, any form of solid iron would also be desirable. The electric furnace can use iron in any form (hot or cold) as its basic charge material.

It will be especially desirable to electric furnace melt shops if small yet efficient direct iron oxide reduction plants can be built at a relatively small investment cost and operated in parts of the country where high grade coking coal is difficult to obtain.

Hydrogen As A Reducing Agent

Hydrogen may play an increasingly important part in the reduction of iron ore. It is entirely possible as the development in the field takes place, hydrogen requirement on a commercial basis will be below 25,000 cubic feet per ton and might approach 20,000. It is easy to arrive at an estimate of the direct reduction costs for the hydrogen reduced product, which now finds its initial tonnage application in the special low sulphur electric furnace charge. Its principal competition would be extra high grade scrap. A study of costs available indicates the production of a high carbon, low sulphur charge such as "H-Iron" should be carefully considered by every electric furnace melting plant producing low sulphur special steel. This is one means of insuring some stability in the cost of the charge which goes into the melting furnaces. It is appealing in areas of high scrap costs and in areas of low natural gas costs. This indicates a field in Pittsburgh (high scrap costs) and Texas (low fuel costs).

Studies have shown that not only "H-Iron" but other hydrogen reduction operations can be reduced to a practice which will produce a melting furnace charge for replacing #1 and #2 heavy melting scrap in almost any furnace. On this basis alone, hydrogen reduced iron ore has a reasonably bright future as long as steel scrap keeps its sensitive relation to supply and demand. It should have the best wishes and interest of every electric melting furnace operator throughout the country.

Carbon As A Reducing Agent

In considering the direct reduction of iron ore, let us remember that if the product which results from such a process is above 95% in iron content, low in carbon and silicon, we wind up with a high iron product with a high melting point. This would be primarily competitive with scrap and not with hot metal or pig iron. In fact, directly reduced iron ore in the form of a very low carbon, low silicon iron of high purity will not fit at all in the open hearth economy. It would fit much better into the electric melting picture where its economic position would be directly compared with available scrap. Both electric furnaces and open hearths would benefit if a relatively high carbon, low silicon iron were available preferably as hot metal or as a cold pig charge.

If another means of reducing iron oxide (ore) for the open hearth or Bessemer is developed, it will be economically necessary to use carbon or carbon monoxide as the basic reducing agent. This is necessary to produce iron in the liquid form and to control the silicon to best suit the melting furnace requirement. The logical approach to such an end would be to melt the highly concentrated iron ore under the best fuel and oxidation conditions of oxygen enriched blast, high temperature combustion. And, to treat the largest possible surface of molten, superheated ore with incandescent carbon and superheated flux. This appears to be a problem for the best combustion engineers and furnace builders. The reduction of iron ore (oxide) by treating it in the molten state with carbon is fast becoming an important means of obtaining iron from ore. It promises someday to become a strong rival of the blast furnace in areas where high grade coke is difficult to obtain.

Hence, no matter what method of iron ore reduction we study—carbon, carbon monoxide or hydrogen, three principal factors in our efforts to improve the process are important: First, the intimacy of the mixture; Second, the continual removal of the reaction products; Third, the accurate control of the temperature.

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Gives greatest flexibility—
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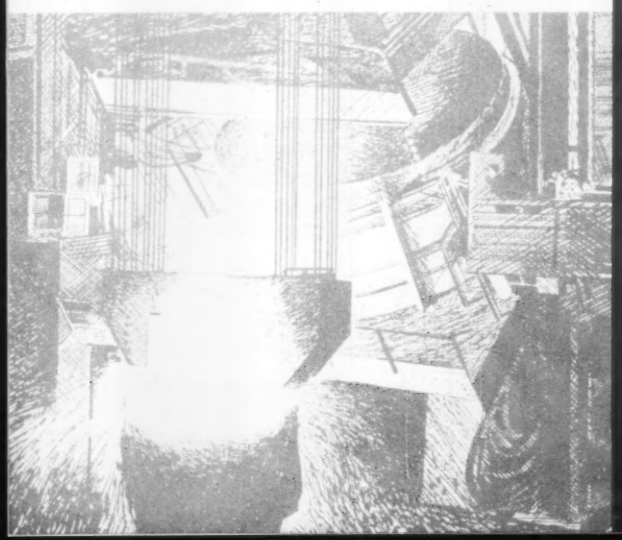
Goes up fast—
Capital investment pays off sooner.

Uses clean fuel—electricity—
No combustion products to contaminate melt.



Submerged Arc Ore Reduction

Under certain conditions where transportation charges, power and other costs are favorable (as they are in many locations), the direct reduction of iron ore by smelting in the submerged arc furnace is more economical than the blast furnace. This is true if we have to engineer and build a blast furnace at present day costs. Here, the high cost of building a new blast furnace involves carrying (fixed) charges which make the submerged arc furnace look especially attractive.

The deoxidation of molten and superheated iron ore with carbon in an electric arc furnace occurs with tremendous rapidity if the carbon-iron ore mixture is intimate and a violent reaction can be permitted. The rate of reaction can be regulated to suit the operator by controlling the temperature and the rate of carbon feed into the really active bath. The problem becomes one of two distinct phases: First, to produce highly fluid, concentrated iron ore. Second, to control closely the reaction of this iron ore concentrate with intimately mixed, finely divided carbon. So far the most successful practice of the ore reduction method has been in Norway, Sweden, Italy and other parts of Europe as well as South America.

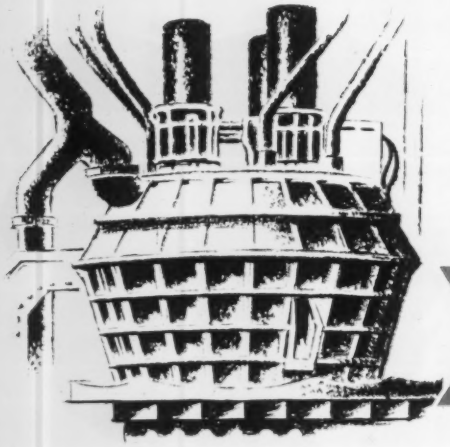
Typical applications in Europe employ the modern electric arc furnace using carbon electrodes which melt and superheat the ore in contact with crushed low grade anthracite. The problem of melting a crushed iron ore and coal mixture in a modern arc furnace is not difficult so long as the ore is molten and the temperature is high enough. The carbon will react rapidly with the oxygen in the fluid ore and reduction is only a matter of minutes. The submerged arc electric furnace is accepted as probably the best means of developing direct reduction of molten iron ore with carbon.

Assuming that a mixture of highly liquid iron ore and carbon is made available, it should be fairly simple to eliminate the oxygen, thereby assuring a liquid charge metal for the open hearth or electric steel furnace. For this reason, the production of hot metal or pig iron from ore might soon become common throughout non-integrated, properly located foundries and steel plants.

Over ten years ago, the first attempts in this field indicated as low as 1300 KW hours per net ton of iron produced when highly concentrated magnetite ore was reduced with carbon in an electric furnace. Now, I am told 1100 KW hours will be closer to the real power requirement per net ton of iron produced in this country. This makes production of electric furnace hot metal or pig iron a very important economic development in the steel industry.

A leading electric furnace steel producer in combination with a large nonferrous metal producer, has now reduced to practice an iron oxide reduction process. This process provides a melting stock for use in steel mill furnaces supplying any desired grade of steel.

It is early to express any opinion on the actual merits of this direct form of ore reduction, but all considerations (including the experience abroad) indicate it is in good hands. The publicity which is expected shortly will, I am certain, show that a new tonnage method of reducing iron oxide to metallic iron with carbon has been developed. It will rapidly be taken over by those electric furnace operators to whom it is especially suited.



SUBMERGED ARC FURNACE
AND ACCESSORY EQUIPMENT

BLAST FURNACE AND
ACCESSORY EQUIPMENT

What are today's

HOT METAL OR PIG IRON

SCRAP

SCRAP

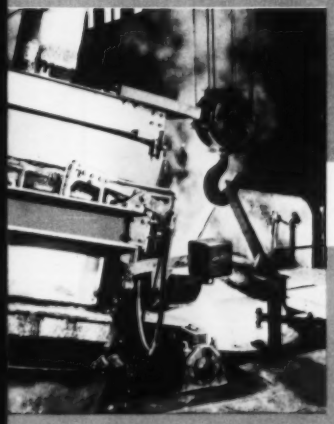
HOT METAL OR PIG IRON

Those interested in this subject should read the article "Electric Furnace Pig Iron" by Dr. E. C. Wright of the University of Alabama, published in the July 1957 Carbon and Graphite News. Also of interest is the chapter on Electric Pig-Iron Smelting by A. G. E. Robiette in his book entitled "Electric Melting and Smelting Practice". These sources offer basic information on the subject of ore reduction by the electric melting furnace.

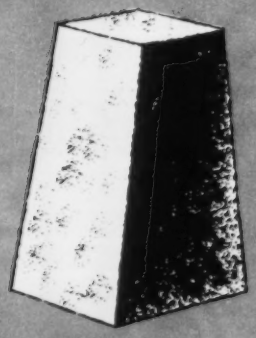
Arc Furnaces In The Integrated Plant

Because of the high investment cost reached in the installation of high tonnage modern open hearth furnaces and accessory equipment, today's thinking has favored large electric arc furnaces. This is particularly true where the present fully integrated open hearth battery is at the full limit of existing hot metal production equipment. Here the addition of one or two large high powered electric arc furnaces can average more than twenty-five tons per hour of semi-killed merchant bar ingots from available scrap. It is interesting when we examine the investment per annual ton, and in this case, the open hearth looks anything but attractive. In some fully integrated

comparative costs per annual ton of steel production?

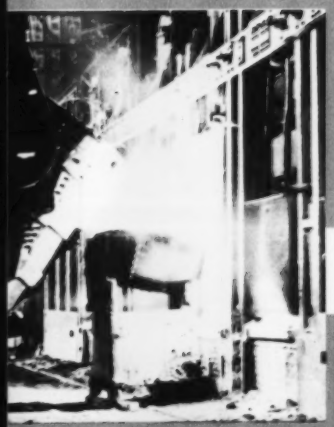


Electric Furnace

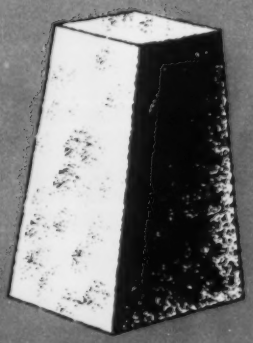


CAPITAL INVESTMENT PER ANNUAL TON OF PRODUCTION ?

In some fully integrated plants, the present investment of the blast furnace and open hearth combination will cause steel plant executives to give thought to the submerged arc electric for smelting and electric furnaces for refining.



Open Hearth Furnace



CAPITAL INVESTMENT PER ANNUAL TON OF PRODUCTION ?

plants, the present investment of the blast furnace and open hearth combination will cause steel plant executives to give thought to the submerged arc electric for smelting and electric furnaces for refining. This is evident since the apparent discovery that savings in power will pay for almost any degree of ore concentration attempted.

Conclusion

It seems apparent that several approaches to the direct reduction of iron oxide as a steel melting furnace charge are not far away. As in all important developments, once the industry-wide conditions indicate the new iron product to be economically desirable, it will be developed. The time is not far away when even the relatively small, more distant steel producer will become well integrated by installing a low cost iron ore reduction unit in one corner of the plant. It will provide him with the most economical charge for his melting furnace and the battle will be on between the scrap supplier and the ore salesman. The larger tonnage steel plant using hot metal or cold pig iron will find it wise to investigate the new iron ore melting practice combined with its reduction by carbon to a high carbon, low silicon, low sulphur hot metal.

Whatever develops, it is apparent that the reduction of iron ore to produce either a molten product similar to blast furnace hot metal, or a solid product similar to low carbon heavy melt steel scrap, has now reached the stage where it is being reduced to practice. It will require many months to determine what method or methods will be adopted by the industry. But, when the development is finally adopted throughout the steel industry, we will no doubt wonder why it took so long.

It is interesting to speculate on the heartbreaking rejections met by some men in trying to introduce an outstanding new development to an industry. Especially has this been true in the past with the steel industry where the direct reduction of iron ore was easy to postpone for another year. But today, continually increasing customers' pressure for improved quality in every product and the increasing evidence of better quality, cost and delivery in your competitors' product, has resulted in the highest possible pressure for development of new and better production equipment. Because of the high investment cost of blast furnace open hearth combinations, present equipment will be kept in operation just as long as it is commercially possible. This makes it difficult for the engineer to answer the sales department's request for increased capacity. The electric arc furnace will try to meet this demand.

The answer must be a development in low cost iron ore reduction practice to provide the steel melting furnace and foundry cupola with a material which will reduce in cost, and stabilize the price of its main charge. It is evident that such a development is now in the making and all that is needed for success is an industry wide concentration on the problem and a pressing demand for results.

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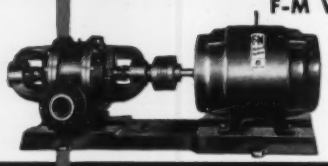
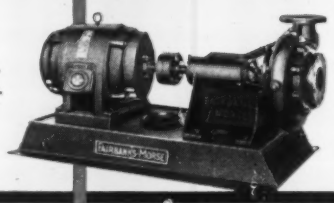
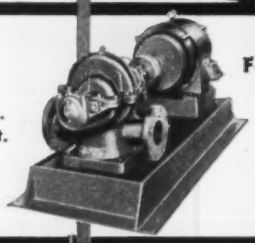
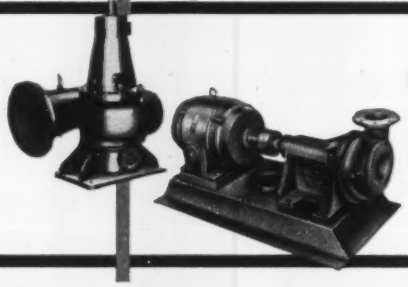
boiler feed condensate return hot and cold liquids chemicals refrigerants, etc.	up to 200 gpm. pressures to 900 ft.	 **F-M WESTCO PERIPHERAL PUMPS** High pressure at normal operating speeds. Handle widely varying heads with little change in capacity. Sizes 1¼" through 2½".
hot and cold liquids liquid circulation nonviscous liquids boiler feed cooling towers, etc.	up to 900 gpm. pressures to 525 ft.	**F-M BUILTOGETHER CENTRIFUGAL PUMPS** General-purpose, close-coupled pump and motor units mount in any position—horizontal, vertical or angular. Sizes ¾" through 5".
sewage slurries paper stock fruit shrimp vegetables, etc.	up to 30,000 gpm. pressures to 175 ft.	 **F-M NON-CLOG PUMPS** Unexcelled for clog-free handling of liquids with solids in suspension. Sizes 2" through 20". Vertical or horizontal. Bladeless or conventional.
water supply plant service booster circulating air conditioning refrigeration chemical liquids boiler feeds, etc.	up to 50,000 gpm. pressures to 700 ft.	 **F-M SPLIT-CASE CENTRIFUGAL PUMPS** High, sustained efficiency over wide range of conditions. Low-cost maintenance. Sizes 1½" through 36". Single stage or multistage.
hot and cold liquids chemicals circulating liquids nonviscous liquids cooling towers condenser circulation, etc.	up to 100,000 gpm. pressures to 250 ft.	 **F-M END-SUCTION PUMPS** A wide line of rugged, precision-built pumps. Sizes ¾" through 54". Horizontal or vertical centrifugal.

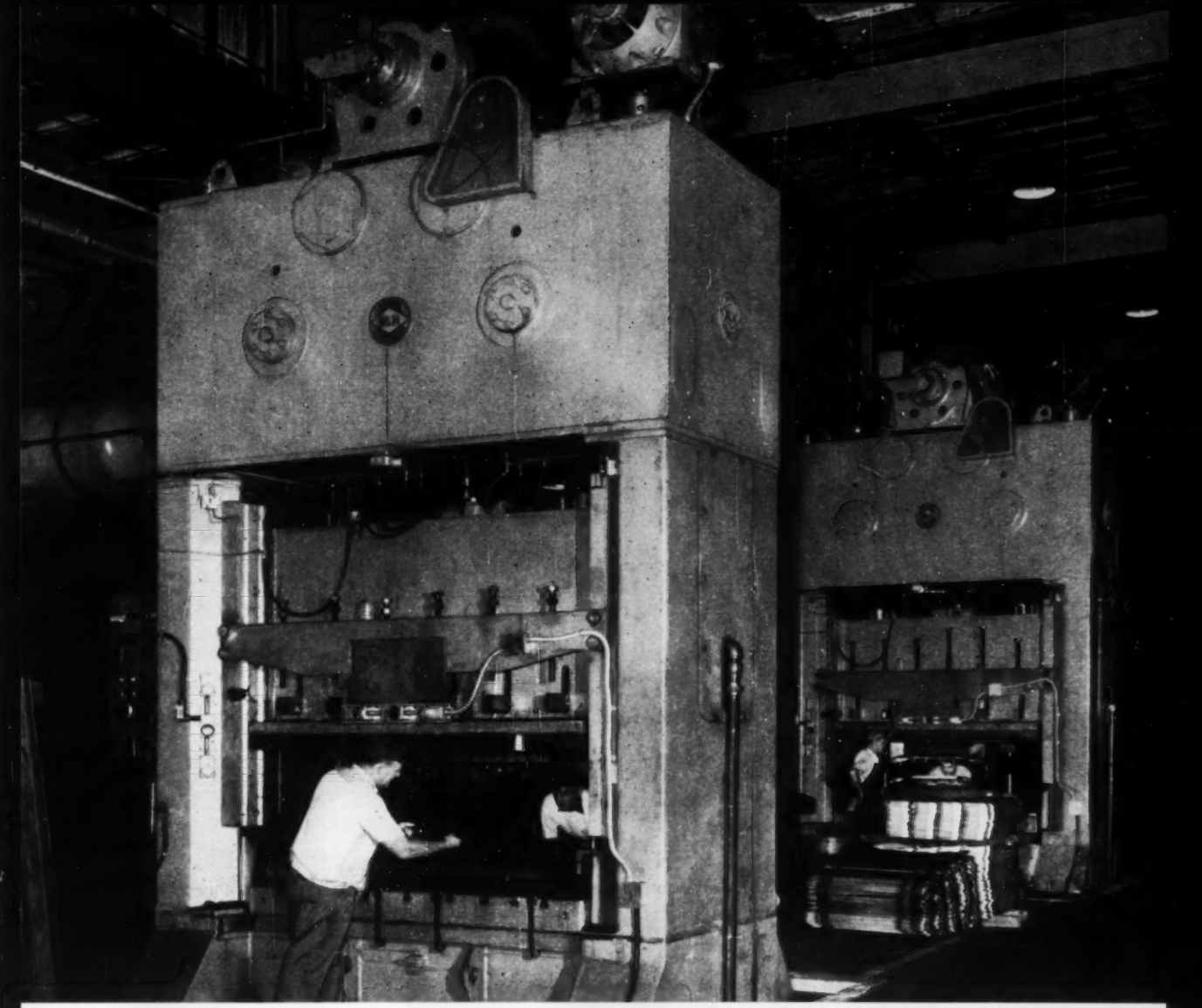
FOR LOW-COST PUMPING *SPECIFY* FAIRBANKS-MORSE

Need new pumps? Your Fairbanks-Morse Dealer has the world's greatest variety for you to choose from. Need help in selection? Your F-M Dealer and F-M Sales Engineer will help specify the right type, right size pump and driver for low-cost, foolproof operation. Call them today, or write Fairbanks, Morse & Co., Dept. S-12-16, 600 So. Michigan Ave., Chicago 5, Illinois.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS



Pictured above are two new Hamilton 400-ton 2-point eccentric presses recently installed at Midland Steel Products, Cleveland, Ohio.

Versatility of Hamilton presses praised by Midland Steel Products

Four new Hamilton-built production presses were recently installed in the frame plant of Midland Steel Products, Cleveland, Ohio. Assistant to Plant Engineer Haldon R. Falquet describes these presses as "extremely versatile and flexible." Currently they are producing parts for 1958 model cars, but they are designed to accommodate the still larger parts now on the drawing boards for 1959 and 1960 models.

Mr. Falquet reports that in his experience there are numerous applications where Hamilton Presses "most often have proved satisfactory in meeting Midland's demands for the required tonnage, shut height, stroke and clearance between columns which enable us to meet our customers' specifications." One of the many Hamiltons in service at Midland is a 4000-ton press—the largest of its kind in the country—and turning out huge side rails for trucks and buses in a single hit.

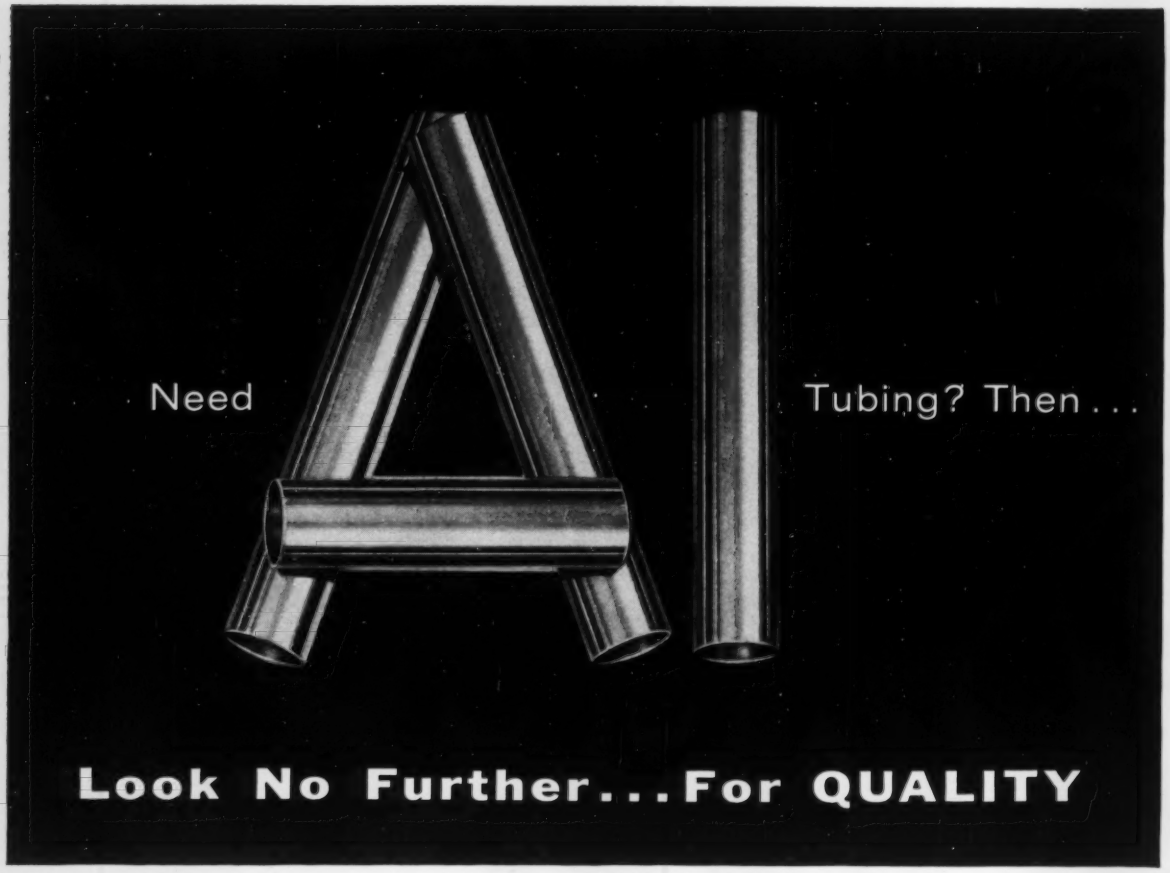
Let us discuss your press problems with you. Perhaps our know-how in press building can save you money or improve your product—or both!

Hamilton Division Hamilton, Ohio

BALDWIN · LIMA · HAMILTON

Diesel engines • Mechanical and hydraulic presses • Can making machinery • Machine tools

BALDWIN BLH LIMA-HAMILTON



Because *BISHOP* small diameter tubing is not excelled in accuracy of I.D. and O.D. . . . in dimensional precision . . . in tolerances . . . in finish.

Whether it be for a precision part in an instrument . . . a heat exchanger in today's high speed aircraft . . . a thermocouple . . . an electronic or atomic application.

Wherever tubing is needed to meet corrosion, heat, shock, stress, psi pressure resistance and vibration . . . for highest quality and performance *specify* BISHOP tubing, at comparable prices.

Catalogs on Request. For Prompt Service, Fast Deliveries Call Malvern, Pa. 3100

SEAMLESS AND WELDED AND DRAWN STAINLESS STEEL TUBING

Mechanical, Capillary, Hypodermic and Aircraft Grade

(.008" to 1.000" O.D.—.003" to .083" Wall)

NICKEL AND NICKEL ALLOY TUBING

(up to .625" O.D.)

TUBULAR FABRICATED PARTS

Flanged, Flared, Milled, Slotted, Swaged and Threaded

GLASS-TO-METAL SEALING ALLOYS

CLAD METALS & COMPOSITE WIRES

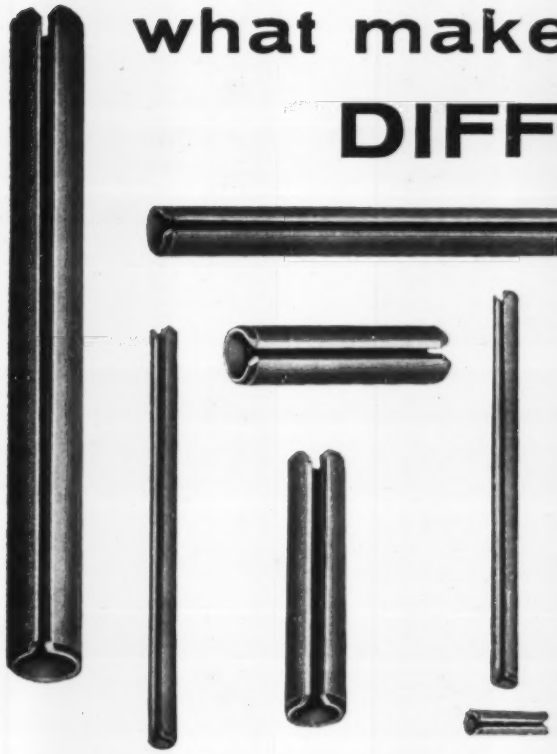
JB

STAINLESS STEEL PRODUCTS DIVISION

J. BISHOP & CO. Platinum Works

Malvern, Pennsylvania

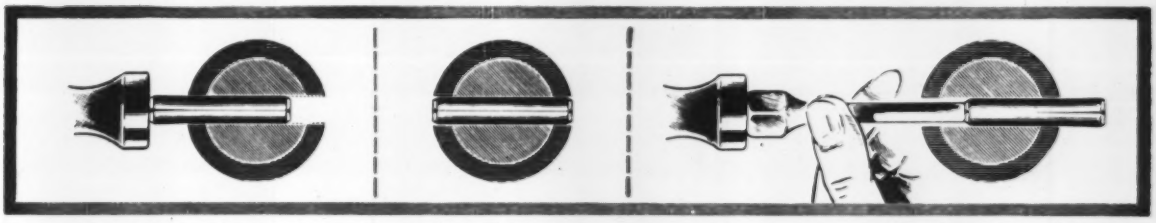
what makes this fastener DIFFERENT?



Several things. Rollpin® is a slotted, chamfered, cylindrical spring pin which drives easily into a hole drilled to normal production standards. It locks securely in place, yet can be drifted out and reused whenever necessary. This eliminates special machining, tapping, and the need for hole reaming or precision tolerances. Rollpin replaces taper pins, straight pins and set screws; for many applications it will serve as a rivet, dowel, hinge pin, cotter pin or stop pin.

And here's another difference that makes Rollpin the quality fastener in the field: ESNA's quality control builds consistent strength and performance into every Rollpin. Rollpin is uniform as to shear strength, dimensions, hardness, and insertion and removal forces

HOW YOU INSERT IT



Drives easily by hammer, arbor press, or air cylinder and can be readily adapted to an automatic hopper feed. Requires only a standard hole, drilled to normal production-line tolerances.

Locks securely in place without using a secondary locking device; won't loosen despite impact loading, stress reversals, or severe vibration.

Removes readily with a drift pin without damage to pin or hole, can be used again and again in original hole.

HOW YOU SAVE

You pay less for Rollpins than for most tapered, notched, grooved or dowel pins. Installation costs are substantially less than for any fastener requiring a precision fit or secondary locking operations.

Because of their tubular shape, Rollpins are lighter than solid pins. Production maintenance is reduced with Rollpins: they do not loosen and because of their spring action they tend to conform to the drilled hole in which they're inserted, without material hole wear, eliminating the necessity of re-drilling or using oversize pins.

MATERIALS AND SIZES

Standard Rollpins are made from carbon steel and Type 420 corrosion resistant steel. They're also available in beryllium copper for applications requiring exceptional resistance to corrosive attack, good electrical, anti-magnetic, and non-sparking properties. Stock sizes range from .062" to .500" in carbon and stainless steels.

ROLLPIN®

ELASTIC STOP NUT CORPORATION OF AMERICA

R40-1260 2330 Vauxhall Road, Union, New Jersey

Please send me the following free fastening information:

☐ Rollpin Bulletin
☐ Elastic Stop nut Bulletin
☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name _____ Title _____

Firm _____

Street _____

City _____ Zone ____ State _____

rigid specifications

Tension tests are required to be made at room temperatures and at 670° F. The following minimum physical properties shall be met:

At Room Temperature:

TS	YS	EL	RA	CHARPY V-NOTCH
70,000	30,000	45	50	50

At 670° F. the minimum tensile strength shall be 51,000 p.s.i. and the minimum yield strength 18,300 p.s.i.

Rejection

Each casting that develops unacceptable defects during shop working or fails to conform to all of the requirements of these specifications shall be rejected. No repair by welding or other means will be permitted.

Radiographic Inspection

(a) Paragraph S5 (a) of the Supplementary requirements of ASTM-A 362-52T.

(b) All castings shall be radiographed 100% and shall conform to ASTM-E7 1-52, Class 2 quality, except as modified by these specifications.

(c) The manufacturer shall establish a positive system of identification of the X-ray plates which shall be subject to approval by the inspector. This system shall guarantee complete coverage by radiographing and provide for positive identification between the plate and the subject.

Inspection of Penetrants

All castings shall be subjected to inspection by fluorescent penetrants or penetrating dyes both inside and out. All cracks, porosity, or flaws revealed as a result of the Dye Penetrant Test shall be due cause for rejection of the casting.

All cast pipe shall be hydrostatically tested to 5,900 p.s.i. and held at that pressure for 20 minutes with zero pipe leakage. Each length of pipe shall be hydrostatically tested at the manufacturer's plant.

The 304L stainless steel shall conform to the following ladle analysis:

Carbon	.03 max.		
Manganese	1.50% max.		
Phosphorous	.03% max.		
Sulphur	.03% max.		
Silicon	2.00% max.		
Chromium	18.00	-	21.00%
Nickel	8.00	-	11.00%

Pipe: All pipe of the following sizes shall be centrifugally cast stainless steel as per ASTM-A 362-52T, except as modified by these specifications:

16" - Sch. #160
12" - Sch. #160
10" - Sch. #160
8" - Sch. #140

All pipe shall be machine finished to 125 micro-inch interior and exterior.

for nuclear power

met by U.S. PIPE patented process

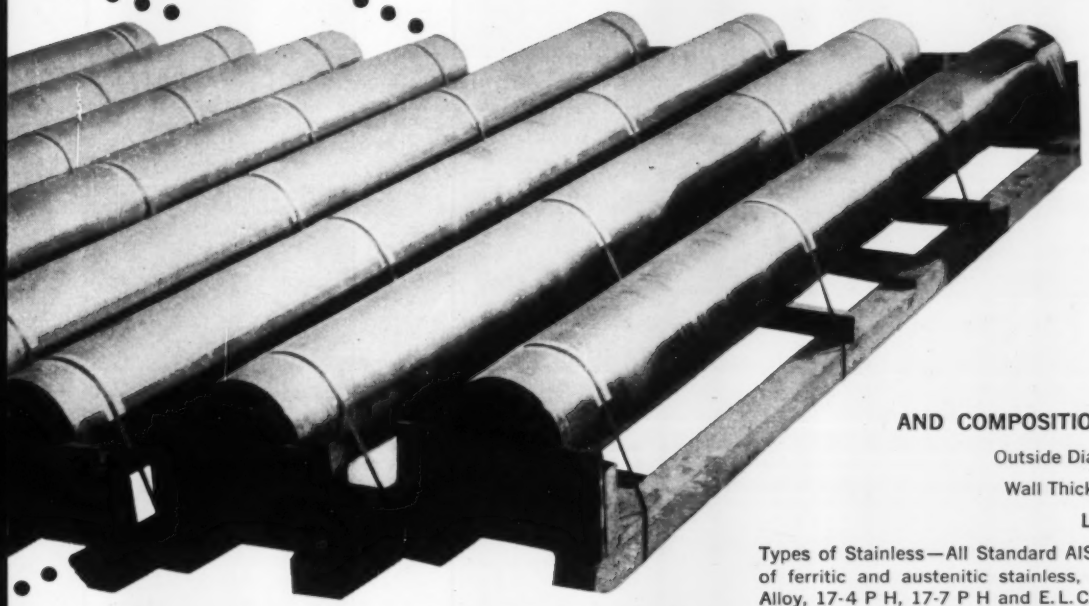
Centrifugally Cast Stainless Steel Solves Many Piping Problems

Combinations of temperatures, pressures and corrosive conditions never encountered before: these are among the piping problems that must be overcome by the men who design the nation's nuclear power installations.

Stainless steel centrifugally cast pipe provides many of the answers. Study the specifications at the left . . . specifications demanded of stainless steel pipe on a recent job for Paul Hardeman, Inc., Los Angeles, California. This pipe is being used for heavy duty, high pressure, elevated temperature service in the primary piping system of the SPERT-III Reactor at the U. S. Atomic Energy Commission's National Reactor Testing Station near Idaho Falls, Idaho. The Stearns-Roger Mfg. Company, Denver, Colorado, is the architect-engineer on this project. A complete tabulation of the actual test data obtained on this pipe and to this specification is available upon request.

U. S. Pipe is headquarters for metal mold centrifugally cast alloy and stainless steel pressure pipe over a wide range of special and standard analyses—in large and small quantities—and to individual specifications.

If piping of the type described above is the bottleneck in your nuclear power planning, write and outline the problem.



SIZE RANGE AND COMPOSITION FLEXIBILITY

Outside Diameter—6" to 50"

Wall Thickness—⅜" and up

Length—Up to 16'

Types of Stainless—All Standard AISI and ACI grades of ferritic and austenitic stainless, including No. 20 Alloy, 17-4 P H, 17-7 P H and E. L. C. grades.

UNITED STATES PIPE & FOUNDRY CO.

Steel and Tubes Division

BURLINGTON, NEW JERSEY

STEEL & TUBES U.S. PIPE DIVISION

SALES OFFICES: LOS ANGELES, SAN FRANCISCO, CHICAGO, ST. LOUIS, COLUMBUS, PITTSBURGH, HARTFORD, BURLINGTON

Why designers specify FLEXLOC self-locking nuts

Where products must be tough . . . must stand up under vibration, shock and abuse . . . designers specify rugged, reliable, precision-built FLEXLOC self-locking nuts as fasteners.

HERE'S WHY:

FLEXLOC locknuts are strong: tensile strengths far exceed accepted standards. They are uniform: carefully manufactured to assure accurate, lasting spring tension in the flexible locking collars. And they are reusable: rough screw threads, repeated removal and replacement, frequent adjustments will not affect their locking life.

Standard FLEXLOC self-locking locknuts are available in a wide range of standard sizes and materials, to meet the most critical locknut requirements. Your authorized industrial distributor stocks them. Write us for complete catalog and technical data. Flexloc Locknut Division, STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

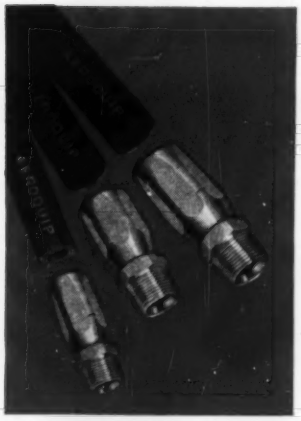
We also manufacture precision titanium fasteners. Write for free booklet.

FLEXLOC® LOCKNUT DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

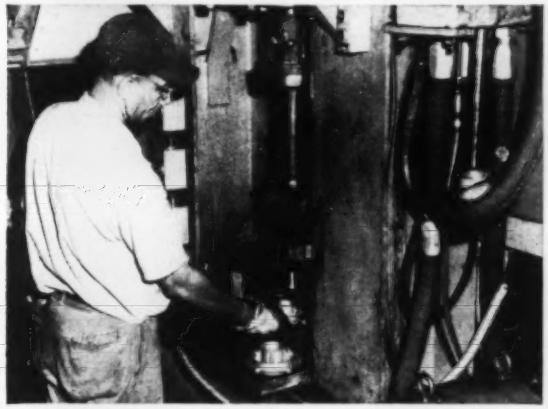


Aeroquip Hose Lines Simplify Maintenance on All Types of Plant Equipment

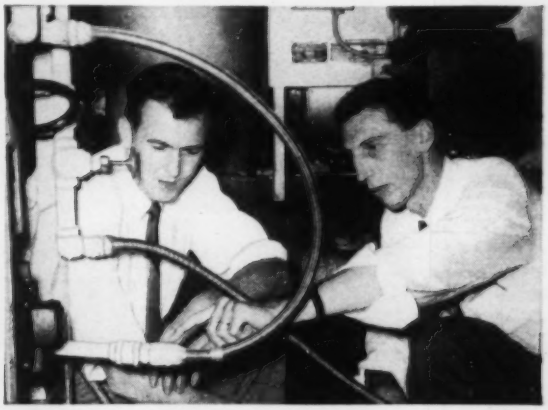
CUT COSTS, SPEED REPLACEMENT, REDUCE INVENTORY WITH AEROQUIP BULK HOSE AND REUSABLE FITTINGS

You can replace all worn and damaged hose lines quickly, easily with Aeroquip. Just cut the length of Aeroquip Hose needed, attach the reusable fittings using ordinary bench tools, and install the new hose line. Replacement is fast, your hose line inventory is limited to a few coils of bulk hose and you cut costs by reusing the hose fittings.

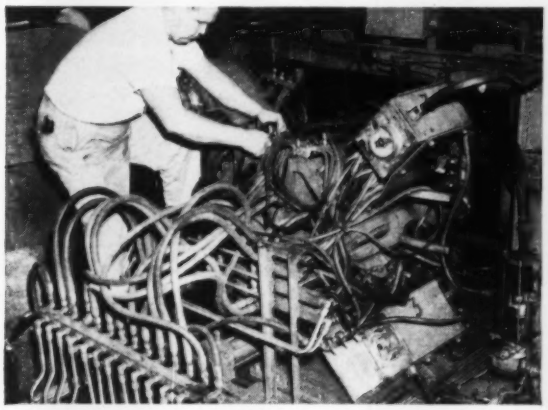
Your Aeroquip Distributor stocks bulk hose and reusable fittings for every industrial application. Call him today. He's listed in the Yellow Pages of your Phone Directory.



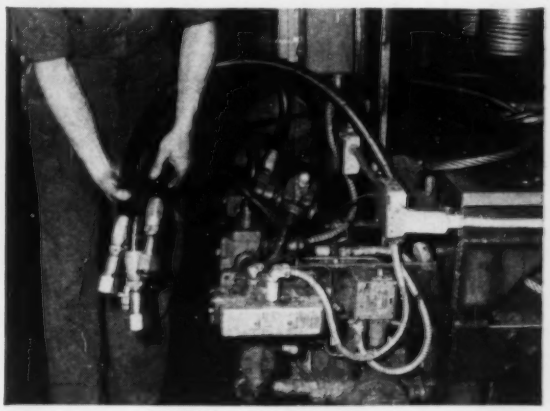
High pressure hydraulic lines made from Aeroquip 1509 Double Wire Braid Hose resist vibration and pressure surges, withstand constant flexing. For fire-resistant hydraulic fluids, Aeroquip 1546 Hose is available.



For corrosive chemicals and high temperature applications, Aeroquip 2802 Hose of Teflon and reusable "*super gem*" Fittings offer long, trouble-free service. 2802 Hose Lines above convey methylene chloride in an aerosol packaging plant.



Using bulk hose and reusable fittings, replacement hose lines of any length can be assembled quickly, right in your plant. Here, Aeroquip 1503 Single Wire Braid Hose is used for hydraulic lines on this resistance welder.



For speedy connection and disconnection of fluid lines under pressure, use Aeroquip Self-Sealing Couplings. One coupling replaces two shut-off valves. On this production bench, Self-Sealing Couplings permit quick interchange of dies.

"*super gem*" is an Aeroquip Trademark

Aeroquip
REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

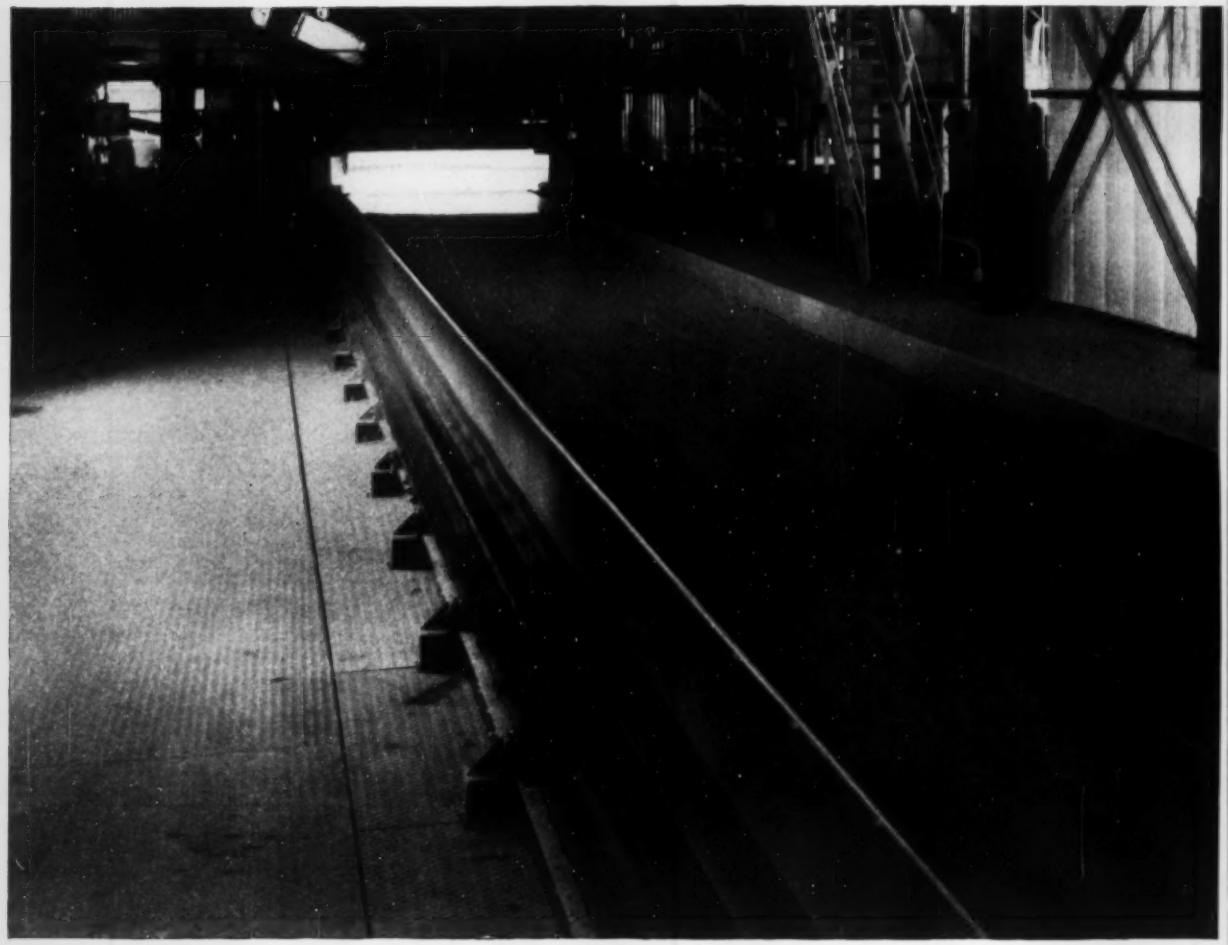
INDUSTRIAL DIVISION, VAN WERT, OHIO • WESTERN DIVISION, BURBANK, CALIFORNIA

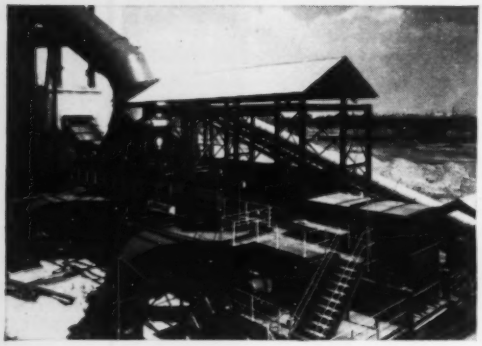
AEROQUIP (CANADA) LTD., TORONTO 10, ONTARIO

LOCAL REPRESENTATIVES IN PRINCIPAL CITIES IN U.S.A. AND ABROAD • AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

A promise kept — Iron production records

Koppers Sintering Plant

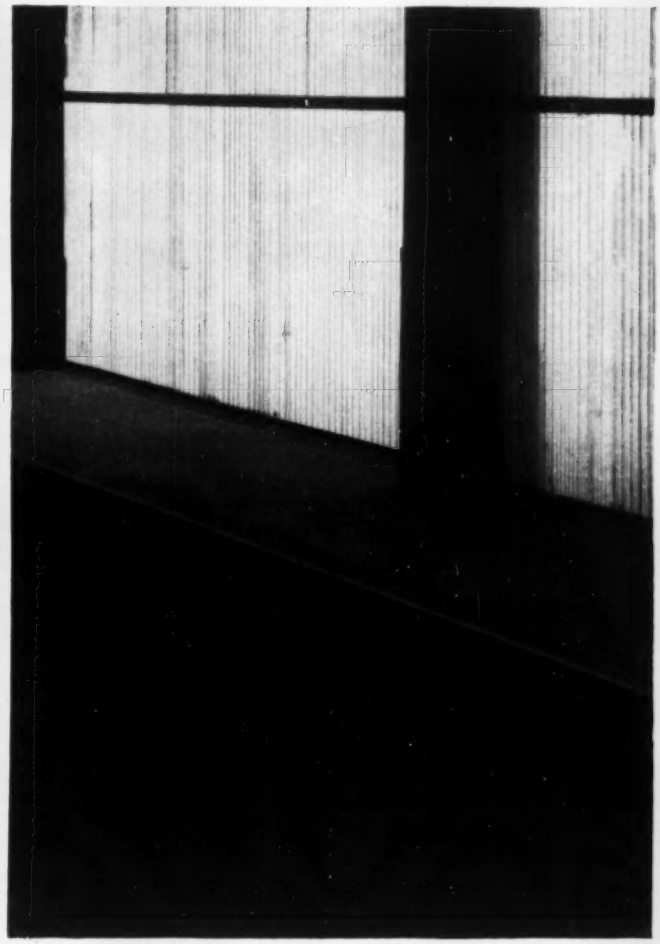




STRAIGHT-LINE SINTER COOLER, at Sheffield, is 6′ x 70′ . . . air-cools sinter for safe handling by conveyor belts, and results in a superior product for the furnace charge.

set at Sheffield with

and Ore Bedding System



SINTERING PLANT was designed by the Freyn Department of Koppers for sintering fine ore, flue dust, filter cake, and limestone. The American Ore Reclamation sintering machine is 6′ x 89′ 3″. In initial operation, it is producing more than 2,000 net tons of sinter per day.

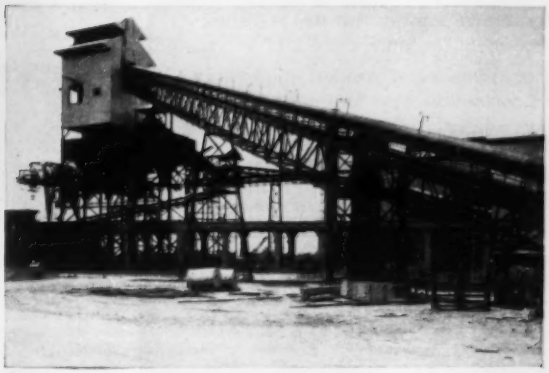
This is a story of sound engineering on a truly complete "turnkey" basis. It is the story of the new sintering plant and ore bedding system recently placed in operation at the Houston Plant of the Sheffield Division, Armco Steel Corporation.

The installation was engineered and built by the Freyn Department of Koppers and typifies the service and results offered by Koppers to the steel industry. Briefly, the story at Sheffield is this:

A PROMISE—After a complete engineering investigation, Koppers recommended equipment and predicted the increase in blast furnace production that could be expected from the installation of a new sintering plant and ore bedding system.

FULFILLMENT—A contract was awarded and Koppers handled design, engineering, procurement, and construction . . . assisted Sheffield in starting up the plant and in instructing crews. Today, the Koppers sintering plant is exceeding all expectations and producing in excess of 2,000 net tons per day, much more than rated capacity. And the use of sinter and blended ore in the blast furnace—coupled with proficient operating practices employed by the Sheffield organization—has increased iron production to a record level, above the performance figure promised by Koppers.

Koppers experience and knowledge of the steel business can pay off for *you*—on any job from ore handling to the installation of a complete steel plant. Let the Engineering and Construction Division build your next job. Koppers Company, Inc., Freyn Dept., Pittsburgh 19, Pennsylvania.



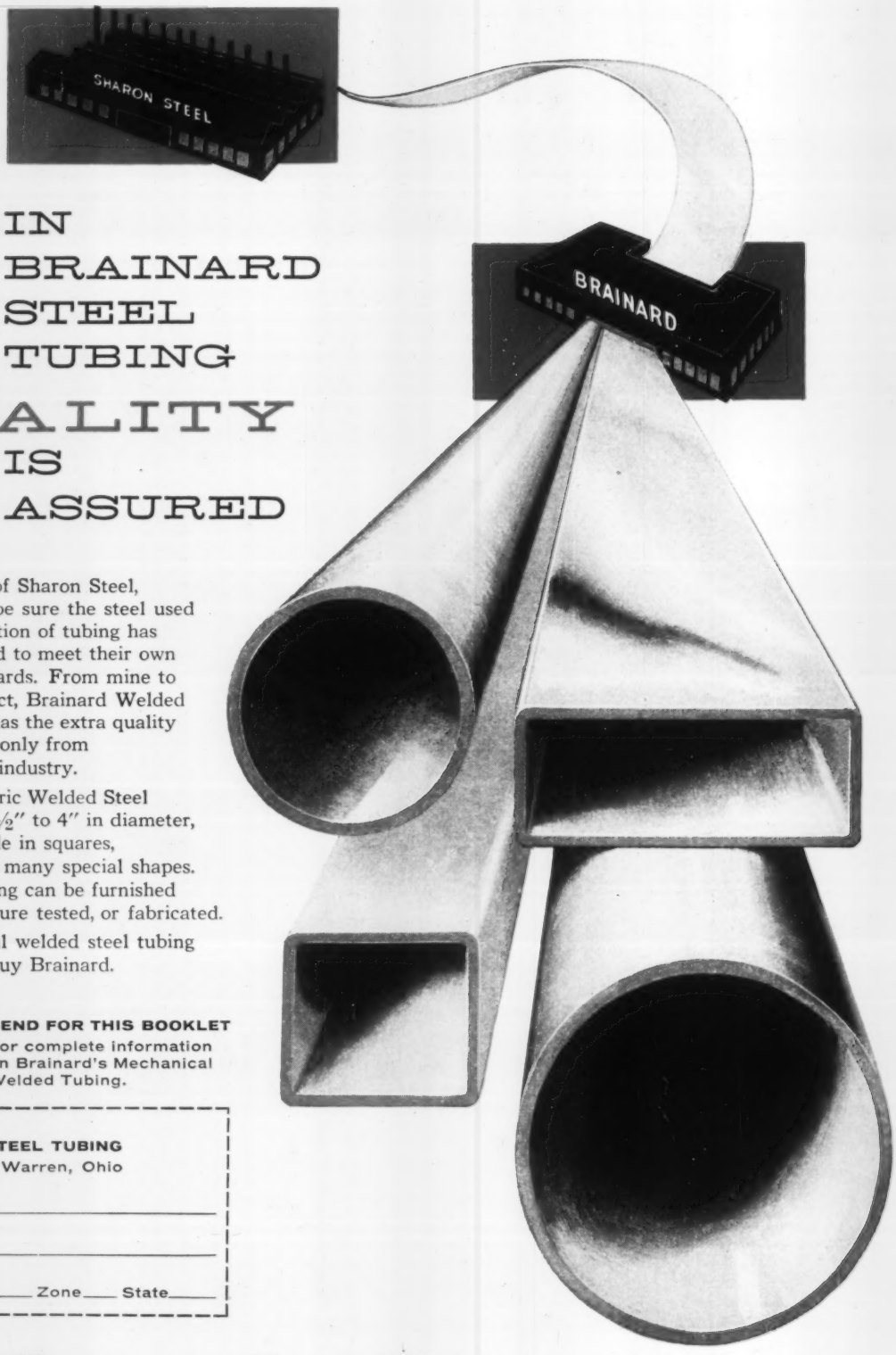
SCREENING STATION separates blended ore into coarse, medium, and fines. The coarse and medium ores are delivered to the blast furnace bins; fines are conveyed to the sinter plant.

ORE BEDDING SYSTEM blends raw Mexican and local Texas ores. Built by Koppers Freyn Department, this installation can handle 500 tons of ore per hour.

KOPPERS

KOPPERS

ENGINEERING AND CONSTRUCTION



IN BRAINARD STEEL TUBING QUALITY IS ASSURED

As a division of Sharon Steel, Brainard can be sure the steel used for the fabrication of tubing has been developed to meet their own exacting standards. From mine to finished product, Brainard Welded Steel Tubing has the extra quality that can come only from an integrated industry.

Brainard Electric Welded Steel Tubing, from ½″ to 4″ in diameter, is also available in squares, rectangles and many special shapes. Brainard Tubing can be furnished swedged, pressure tested, or fabricated.

For mechanical welded steel tubing of top value, buy Brainard.

SEND FOR THIS BOOKLET
For complete information on Brainard's Mechanical Welded Tubing.

BRAINARD STEEL TUBING
Griswold St., Warren, Ohio

Name _____

Address _____

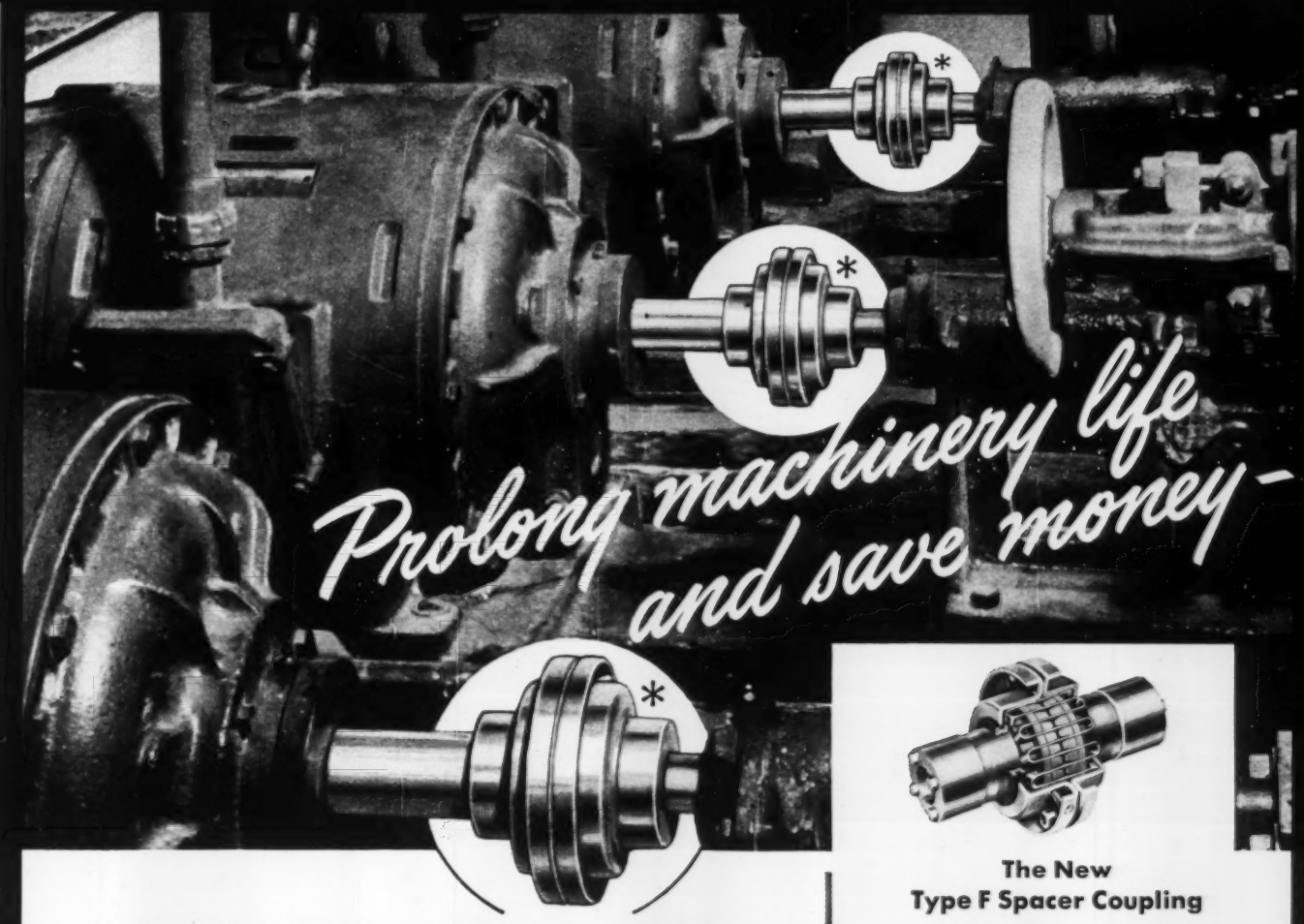
City _____ Zone ____ State ____

Brainard Steel Tubing

SHARONSTEEL

400

Brainard Steel Division, Sharon Steel Corporation
Griswold Street, Warren, Ohio



Prolong machinery life and save money—

with FALK Steelflex Couplings

Ever since the first Falk Steelflex Coupling was designed and built, we have firmly held to these beliefs:

1. A coupling, to give fullest value, must do more than merely *connect* driving and driven machinery—it must *protect* the machinery and prolong its life.

2. A coupling, to be truly flexible, must overcome the effects of shock and vibration, as well as shaft misalignment.

Proof of the soundness of those beliefs is furnished by the record. More than one million Falk Steelflex Couplings have been used on every conceivable type of industrial application . . . giving trouble-free service, providing maximum protection to connected machinery.

* A single basic type—the famous Type F—fills 90% of all industrial application needs. It is versatile, efficient and economical. And—it is always available from factory, field or distributor stocks, in a wide range of sizes.

Write to Department 247 for engineering bulletin, including selection and dimension tables.

THE FALK CORPORATION, MILWAUKEE, WISCONSIN

MANUFACTURERS OF:

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

FALK

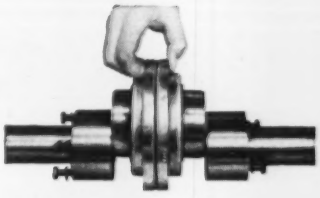
...a good name in industry

The New Type F Spacer Coupling

Here is a Steelflex coupling specially designed to permit fast, easy installation and removal in horizontal and vertical applications where it is impracticable to move the connected units—or where a space-gap (up to 12 in.) is necessary.

Like all Steelflex couplings, the Type F Spacer gives long, trouble-free service and maximum 3-way protection for connected machinery: it provides torsional resilience to reduce shock and vibration; it accommodates parallel or angular shaft misalignment; it allows free (or limited) end float.

An outstanding feature of the Steelflex Spacer is that it can be installed or removed in one piece (see photo below); no dismantling or servicing of the coupling is required. Pump assemblies can be disconnected and removed without disassembling the coupling, without exposing working parts.



The Steelflex Spacer coupling is prelubricated at the Factory and can be installed, or removed and reinstalled, without disturbing the lubricant—a highly desirable feature.

Here's the way to MODERNIZE your Forge Shop

Economically · Quickly

Put CECO-DROP *upperworks on your board drop anvils—*

For quick modernization at a minimum cost, investigate the possibility of fitting Ceco-Drop upperworks to your present board drop anvils and foundations.

You can have the benefit of all the advantages and exclusive features of the Ceco-Drop without being involved in the time and expense of replacing the anvil or disturbing the foundation.

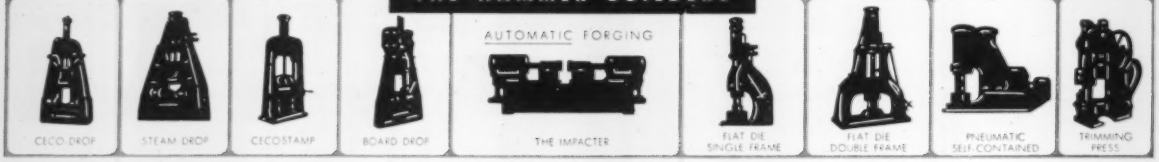
With the Ceco-Drop upperworks, you'll have improved production rates, economies in operation and operator satisfaction that will well repay the investment.

Write or phone us.

CHAMBERSBURG ENGINEERING COMPANY . . . . . CHAMBERSBURG, PA.

CHAMBERSBURG

THE HAMMER BUILDERS



NOTHING *can equal Stainless Steel*

in its unique combination of properties

No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength, hardness, beauty, cleanability and easy fabrication. For a reliable source of supply, United States Steel offers you the widest range of types, finishes and sizes.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
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TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

SHEETS • STRIP • PLATES • BARS • BILLETS
PIPE • TUBES • WIRE • SPECIAL SECTIONS

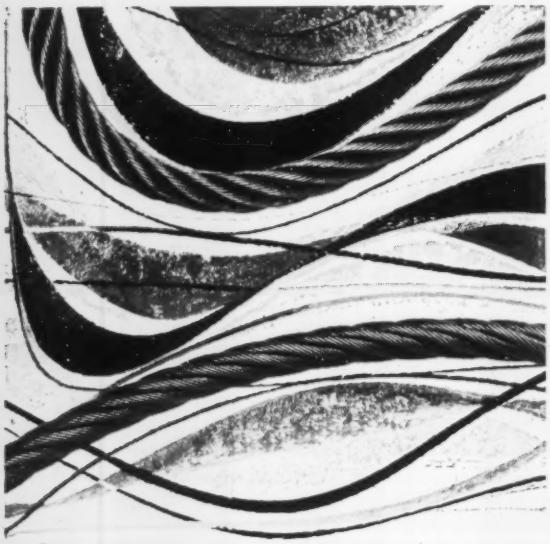
USS

UNITED STATES STEEL

FOR HIGH TEMPERATURE STRENGTH. The Ryan Firebee is a pilotless jet airplane that flys about 600 mph at altitudes up to 40,000 feet. All three armed services are using it for target practice—to simulate attacking aircraft. Fuselage and turbojet engines use substantial quantities of Stainless Steel—mostly because of its excellent strength/density ratio at elevated temperatures.

FOR CORROSION RESISTANCE. If you're a photographer, you know that hypo is awfully corrosive. This print washer (it holds 75 8x10 prints in one loading) is made completely from Stainless Steel by the Arkay Corporation, in Milwaukee. For proof that Stainless is easy to fabricate, notice that the drum has 1,700 perforations, and double lockseam soldered joints are used throughout.

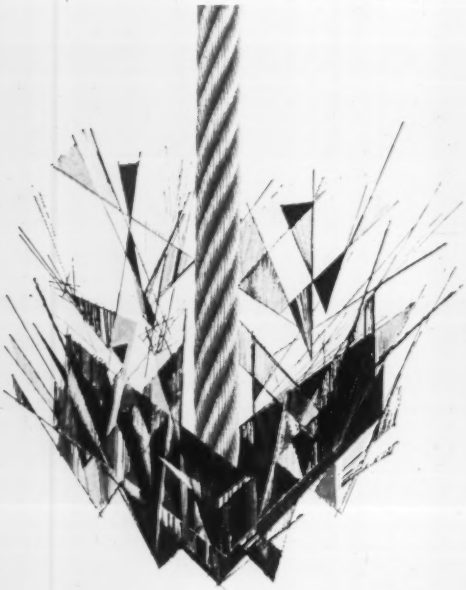
FOR TAKING A BEATING. These supermarket check-out counters are made from USS Stainless Steel. They withstand the pounding of heavy containers and are unaffected by corrosive meat and produce juices. It only takes 20 minutes for one girl to clean all eleven counters shown here. The Robert Becht Company of Cincinnati made them.



Stands up to **bending fatigue**

Absorbs **shock** and **impact**

Has **higher strength**



Withstands **Abrasion**

These four qualities
in Roebling Royal Blue Wire Rope
mean **longer service life!**

They all add up to the fact that Roebling Royal Blue will deliver more work on your job—regardless of what it is. It's as simple and money-saving as that. For full information on Royal Blue, the rope that's stronger than yesterday's strongest, talk to your Roebling Distributor or write Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities—
Subsidiary of The Colorado Fuel and Iron Corporation

Allen-Bradley Line
of MOTOR CONTROL
includes Both!

D.C.

A.C.

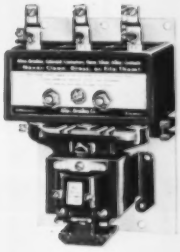
RELAYS AND CONTACTORS

Bulletin 200, Type G Relay. Rated: 5 amp, 64 v; 2 amp, 125 v; 0.5 amp, 250 v.

Bulletin 202 Contactor, Size 2, 1 Pole. Rated: 50 amp, 115-230 v.

D.C. relays are made with up to 8 poles. Also universal types, having contacts changeable from N.O. to N.C.—or vice versa—by merely reconnecting the terminals. Up to and including the 150 ampere rating, D.C. contactors are of the solenoid type; beyond this rating, up to and including 600 amperes, the clapper type construction is used.

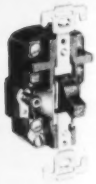
Bulletin 700, Type C. Rated: 10 amp, 550 v max.



Bulletin 702, Size 2, 3 Pole. Rated: 50 amp, 550 v max.

A.C. relays are made in different types for various applications, with up to 8 poles. The universal type, having contacts changeable from N.O. to N.C.—or vice versa—is very popular. The A.C. solenoid contactors, made in 9 ratings up to 900 amp, 550 v max., will satisfy any service requirement. Silver alloy contacts are used throughout the D.C.-A.C. solenoid relay and contactor lines.

ACROSS-THE-LINE STARTERS

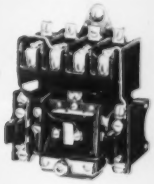


Bulletin 600, Form 52, double pole only, open type. Max rating: ¾ hp, 115-230 v.

Bulletin 209, Form 2. Max rating: 1½ hp, 115 v; 2 hp, 230 v.

D.C. manual starters have a rugged, snap action mechanism that prevents contact "teasing" and thus prolongs contact life. D.C. manual and solenoid starters have maintenance free, double break, silver alloy contacts. Motor overload protection is reliable.

Bulletin 600 in general purpose enclosure, complete with reliable overload breaker. Rated: 1 hp, 110-220 v.



Bulletin 709, Size 1. Rated: 7½ hp, 220 v; 10 hp, 440-550 v. Same general construction for max ratings of 300 hp, 220 v; 600 hp, 440-550 v.

All Allen-Bradley A.C. motor control is equipped with silver alloy contacts which are always in good operating condition. Because all A-B solenoid starters have only one moving part, trouble free performance and long life are automatically assured. It is the basic reason for Allen-Bradley's "quality" reputation.

A-B QUALITY

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

MORE ON NEXT PAGE!

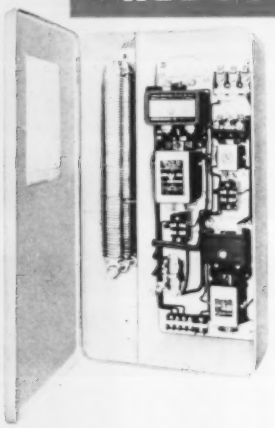
13-57-MR

...and more

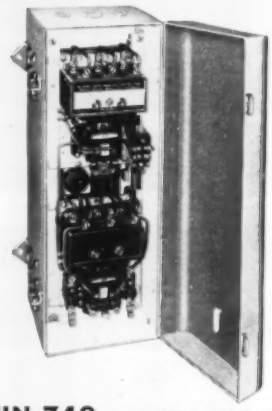
Allen-Bradley MOTOR CONTROL

D.C. | A.C.

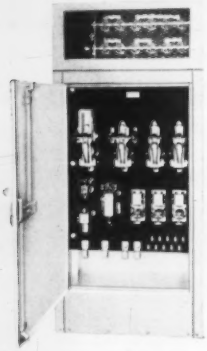
REDUCED VOLTAGE STARTERS



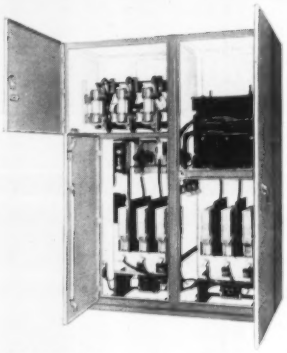
BULLETIN 267 are time limit, resistor type starters for automatic acceleration of constant speed shunt and compound wound D.C. motors. Solenoid contactors used up to and including Size 4 ratings. Max ratings: 75 hp, 115 v; 150 hp, 230 v.



BULLETIN 740 are graphite resistor type starters for automatic acceleration of squirrel cage A.C. motors. Made with 1 or 2 points of acceleration. Can provide velvet smooth acceleration for squirrel cage motors. Max ratings: 200 hp, 220-440-550 v.



BULLETIN 268 are time limit resistor type starters for automatic acceleration of adjustable speed shunt and compound wound D.C. motors. Designed for heavy duty service. Both Bulletin 267 and 268 starters available with or without dynamic braking feature, and also for reversing service. Max ratings: 75 hp, 115 v; 150 hp, 230 v.



BULLETIN 983 high tension starter illustrated above is of the reactor type, intended for starting synchronous motors. Available as an autotransformer reduced voltage starter; also in the across-the-line construction. The heavy duty, solenoid air break contactor assures long, trouble free life. Max ratings: 1500 hp, 2300 v; 2500 hp, 4600 v. at 0.8 P.F.

The Allen-Bradley *quality* line is *not* limited to alternating current motor control. A companion line of direct current motor control is available with the same outstanding *quality* . . . the same reliability . . . the same ability to "take it." Both lines are described and listed in our latest A-B Handy Catalog, and our trained field engineers will also be glad to help you with your control problems.

You cannot make a mistake when you insist on Allen-Bradley control.

A-B QUALITY

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

QUALITY

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

13-57-MR

Largest bronze centrifugal casting ever made, 54¾" O.D. x 49½" I.D. x 346½" long. Charge weight—72,300 pounds.

At Sandusky,

GIANTS ARE ROUTINE...

Small wonder. We serve giant industries . . . paper-making, shipbuilding, metalworking, atomic energy, petro-chemical, and others . . . with centrifugally cast cylinders and tubular parts, many of which can't be made by any other process to the exacting standards required.

It's the 47 years of specialized experience coupled with unequalled manufacturing facilities . . . that makes it routine for our engineers and production teams to cast and machine *cylinders from 7" to 54" O.D. and up to 33 feet in length* . . . in a wide range of alloys meeting special performance requirements.

Do you need a giant cylindrical form . . . or a small one . . . machined to exact working dimensions? Send us your specifications; we'll reply promptly.

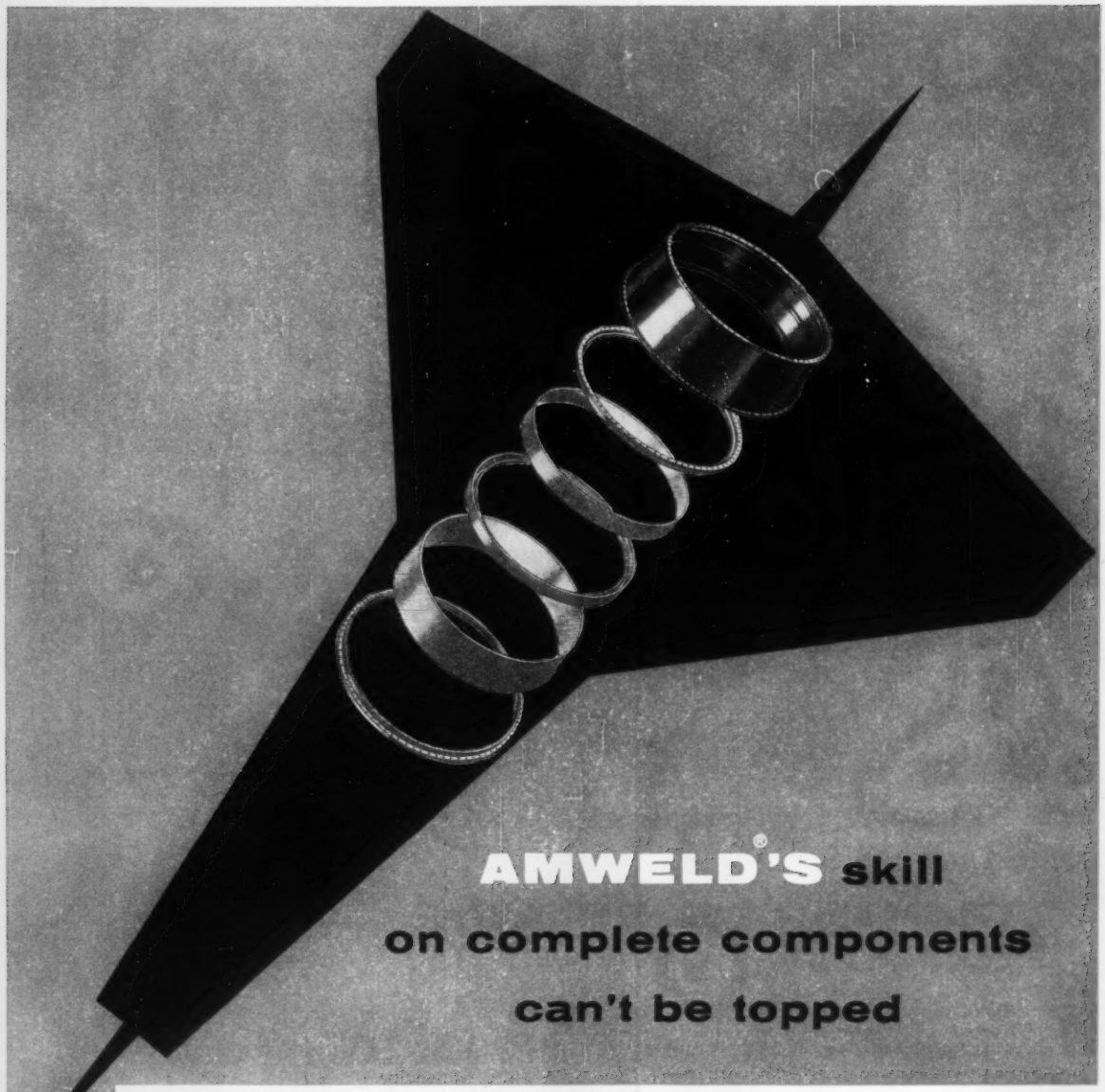
Sandusky Centrifugal Castings offer you 4 important advantages:

1. ***SUPERIOR MECHANICAL PROPERTIES*** —to meet exacting design requirements
2. ***UNIFORM SOUNDNESS***—free from harmful inclusions and porosity
3. ***HIGHEST QUALITY***—to insure long, dependable, trouble-free service
4. ***JOB-READY CASTINGS***—machined to your exact specifications, eliminate extra costs from rejects, down-time, loss of production

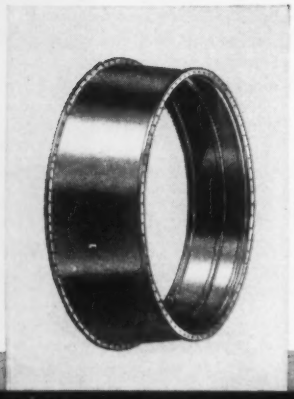
CENTRIFUGAL CASTINGS

Sandusky Foundry & Machine Company

SANDUSKY, OHIO • Stainless, Carbon, Low Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys



AMWELD® skill
on complete components
can't be topped



As a supplier of welded rings and components to major United States jet engine manufacturers, American Welding has proven its skill as part of an industry where cost and precision are vital factors. As the missile and rocket programs grow from the experimental to the production stage, Amweld's experience and skill can play a part in these essential programs.

If you have a problem that can be solved by a rolled and welded ring or component, or any welded fabrication, contact American Welding's Industrial Products Division. Their skill, experience, and engineering are at your service.

THE AMERICAN WELDING & MANUFACTURING COMPANY
110 DIETZ ROAD WARREN, OHIO

AMERICAN WELDING
The World's Leading Manufacturer of Welded Rings

Metalworking Outlook

Apprentice Training Lags

Our training of apprentices is lagging as seriously as our program for the schooling of scientists. Less than 260,000 apprentices are training in all U. S. crafts today. That's not even enough to replace the journeymen who will retire or die. Prof. Walter Galenson of the University of California at Berkeley, a student of the Soviet's industrial training, says: "There can be no doubt that Russia's industrial training has contributed importantly to its economic strides."

1957: Peaceful Labor Year

Look for 1957 to turn out to be the most peaceful labor year since World War II. Mandays lost in 1957 probably will be under 18,000, compared with 20,300 in 1951, the previous postwar low. The 1935-39 average was 16,900. Prospects for 1958, though, are not so bright. Odds favor an auto strike beginning next June 1.

Retaliation by Teamsters?

Troubles faced by the Teamsters' union and its officers in the courts and Congress will certainly delay—and may indefinitely postpone—retaliation against the AFL-CIO for expelling it. Einar Mohn, the Teamsters' administrative vice president, insists there will be no retaliation. If James R. Hoffa can be disposed of, chances are good that the union can re-enter the federation. Both sides want peace.

Chicago Buyers Report

Purchasing agents of Chicago report: Deliveries are faster; prices are stable; inventories continue to be cut; employment edges downward; production is declining; order backlogs are markedly lower; profits are shrinking; 93 per cent are placing orders on a 60-day maximum delivery schedule; 30 per cent expect business to improve in the first half; 54 per cent foresee the continuation of present levels; 16 per cent expect volume to decline more.

Missiles Spark Steel Queries

The prospect of more missile business is sparking a flood of inquiries to makers of specialty tool and hardened steel for high temperature work. One Detroit firm says it received more than 100 requests last week. It figures 25 or 30 will result in orders. Almost all are from fabricators of missile parts.

Missile Backlogs Grow

Lockheed Aircraft Corp. has a missile backlog of more than $100 million. It expects to increase its missile work force to more than 7000 during

1958. The present figure is 5800. One-third of Douglas Aircraft Co.'s order backlog is for missiles, double the percentage of one year ago.

10 Million Tons of Aluminum by '75

While the national economy is expected to double by 1975, Reynolds Metals Co. predicts the use of aluminum will jump fivefold—from 2 million to 10 million tons. It also forecasts: The electrical industry will consume more than 1 million tons by 1975, compared with 250,000 tons in 1955; transportation will use 3 million tons in 1975, vs. 400,000 tons in 1955; construction will use 2 million tons in 1975, vs. 500,000 in 1955. Aluminum use by the chemical processing industries will almost double by 1960, Reynolds believes. Consumption by then will reach 46,000 tons.

J&L Goes to Basic Oxygen

Jones & Laughlin Steel Corp. becomes No. 2 on the list of American companies to make steel by the basic oxygen process. (McLouth Steel Corp. led off. Kaiser Steel Corp. and Acme Steel Co. will soon join the parade.) The two furnaces operating at J&L's Aliquippa, Pa., works add 400,000 tons to the plant's annual ingot capacity. They represent an investment of $15 per annual ingot ton, compared with $40 for new open hearths. Although rated far lower, the furnaces will soon be tapping 100-ton heats. The facilities will be used primarily to produce low carbon, low metalloid steels.

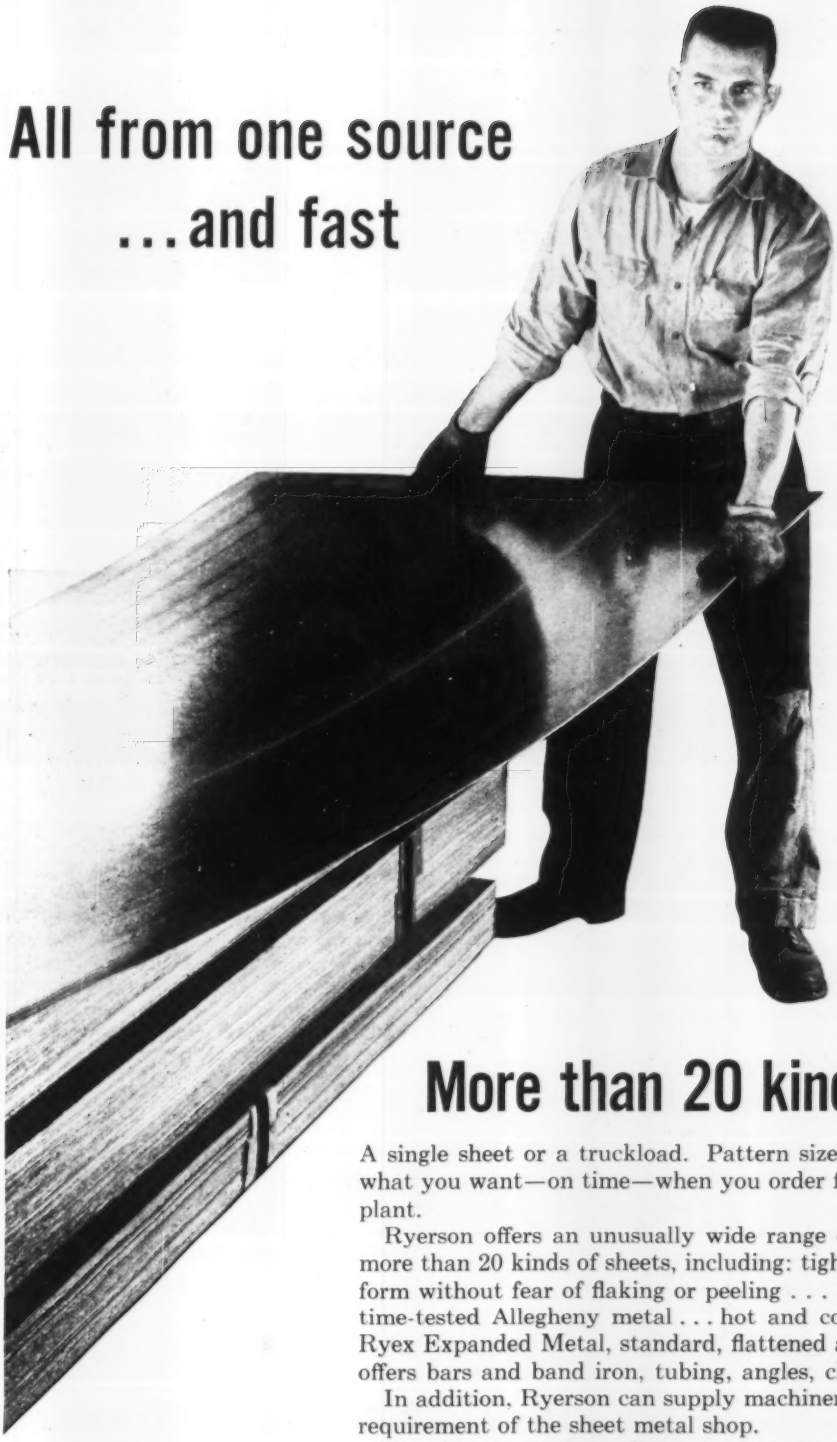
National Carbon Develops New Process

A multimillion dollar plant for a revolutionary production process that cuts the manufacturing time of industrial carbon products from eight weeks to less than 8 minutes is in production at Lawrenceburg, Tenn. The process was developed by National Carbon Co., a division of Union Carbide Corp. A two-step method forms carbon products in giant presses while high electrical currents simultaneously heat the product to baking temperature. Heart of the process is a hydraulic press that operates at an average pressure of several tons per square inch. The flexibility of the system makes it possible to change pressures, temperatures, and cycle timing to produce carbon products with a variety of properties.

Straws in the Wind

Inland Steel Co.'s president, Joseph L. Block, predicts 50 million to 52 million ingot tons of steel will be produced in 1958's first half, compared with 60 million in 1957's first six months and 53 million in the second half . . . In 1957's first 11 months, 105.3 million net tons of ingots were produced . . . The iron and steel industry's estimated total payroll increased to $345.6 million in October, compared with $330.1 million in September . . . One of every 20 employed workers was supplementing his regular income by holding two or more jobs when the Census Bureau surveyed the situation last July.

All from one source ...and fast



More than 20 kinds of sheets

A single sheet or a truckload. Pattern sizes or cut-to-order. You get what you want—on time—when you order from your nearby Ryerson plant.

Ryerson offers an unusually wide range of gauges and patterns in more than 20 kinds of sheets, including: tight-coat galvanized you can form without fear of flaking or peeling . . . bright-finished stainless in time-tested Allegheny metal . . . hot and cold rolled carbon steel . . . Ryex Expanded Metal, standard, flattened and grating. Ryerson also offers bars and band iron, tubing, angles, channels, etc.

In addition, Ryerson can supply machinery and tools to meet every requirement of the sheet metal shop.

For all your steel requirements, it pays to call Ryerson.

RYERSON STEEL

Principal products: Carbon, alloy and stainless steel — bars, structurals, plates, sheets, tubing — industrial plastics, metalworking machinery, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • INDIANAPOLIS • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The PROOF of DSC STEEL is in its PERFORMANCE ON YOUR JOB

DSC Deep Rolled RBF Strip

(the sure-working steel with eye appeal)

helps K-VENIENCE* clothing carriers satisfy airline appearance and serviceability requirements

CAPITAL'S WORLD-RENOWNED VISCOUNT

PHOTOS: COURTESY KNAPE AND VOGT MFG. CO. AND CAPITAL AIRLINES

These carriers, like other K-Venience clothes closet fixtures, promote housekeeping efficiency in the home, in stores and offices . . . and in airplanes.

What makes these products BIG BUSINESS? For one thing, they are good-looking. They do a needed job neatly, efficiently, durably. Attractively priced, they appeal to the value-wise lady-of-the-house and to professional buyers.

How does DSC STRIP help create these values? The answer is in its deep-rolled brightness, even gauge and uniform temper. These job-fitted qualities combined with capable workmanship and expertly designed tools and dies make for rapid, steady production. Results: fabricating, finishing and assembly costs are closely controlled, purchasing profits nailed down. That's how DSC STRIP has been consistently performing for the Knape and Vogt people for 17 years.

THE FINEST YOU CAN BUY
KV FIXTURES

Clothing carriers are among K-VENIENCE clothes closet accessories. Other KV products include store fixtures and builders hardware.

Ask a DSC Customer "Rep" about testing DSC STRIP yourself . . . Soon?

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Customer Satisfaction Is Our Business

DETROIT STEEL CORPORATION

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN
DSC CUSTOMER "REPS" IN PRINCIPAL CITIES

DSC MILLS AND PRODUCTS

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Coke • Coal Chemicals • Pig Iron
Basic OH Steel Ingots • Blooms • Slabs • Billets • Rods
Hot Rolled and Cold Rolled Sheets • Low and Medium Carbon
Manufacturers' Wire • High Carbon Specialty Wire • Aluminum Cable Strand
Reinforcement • Rope Wire • Tire Bead Wire • Welded Wire Fabric

MILL DIVISION: DETROIT, MICH., HAMDEN, CONN.
Cold Rolled Carbon Steel Strip
Flat Cold Rolled Carbon Spring Steel

*Reg. T.M. Knape and Vogt Mfg. Co., Grand Rapids, Michigan

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'58 To Separate Men from Boys

In planning for 1958, your organization will need all the ingenuity at its command to retain, let alone improve, its competitive position.

Influences which are pushing and pulling at the economy must be evaluated in terms of your business.

Here's the situation in a nutshell:

Wages Will Be Up: Labor is in the driver's seat. The Auto Workers undoubtedly will get substantial wage increases and perhaps a shorter workweek next summer. Automatic adjustments under present contracts with the Steelworkers will cost the companies 17 to 18 cents more by July 1, 1958.

Materials Will Be Up: Higher wage costs will be translated into higher prices. Finished steel has gone up every year since World War II, including the depressed years, 1949 and 1954. The steel industry expects it will have to pass along higher wages again in 1958. It will take a $7-a-ton increase in finished steel to offset an 18-cent wage package.

Productivity Is Still Down: Wages have risen an average of 6 per cent a year since World War II, productivity only 3.9 per cent annually.

We expect to see remedial steps in two main areas: Productivity improvement and marketing.

Some companies, for example, are studying product design in relation to the newest, cost-cutting techniques. Others are taking a fresh look at plant layout and equipment requirements to see where costs can be cut. A lot of money will go into research and development. Industry spent $7 billion on R&D in 1957. It'll spend even more in 1958.

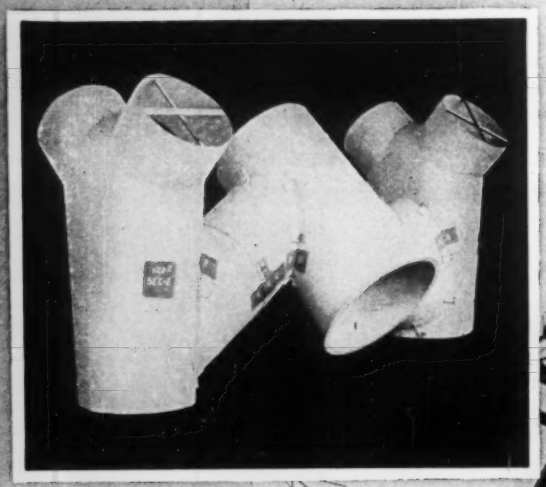
The new concept of marketing involves finding out what the customer wants through market research, making the product by the most economical methods, and selling it through a well-trained sales organization, backed up by effective promotion.

We believe such efforts will pay off because we're sure the business will be there for those who work for it.

Even though participants in STEEL's annual forecast (to be published Jan. 6) express less optimism than they did a year ago, they expect metalworking dollar sales in 1958 to be 2 or 3 per cent higher than they were in 1957. Another record year is possible. A near-record year is definite, but, as we said competition will be fierce. The men will be separated from the boys.

Irwin H. Such

EDITOR-IN-CHIEF



ENGINEERING . . . FABRICATION . . . AND ERECTION BY *Pollock*

The William B. Pollock Company is the oldest engineer, fabricator and erector of steel work for blast furnaces in the world

Only a few companies in the world can engineer, fabricate and erect the steel work for a complete blast furnace, and The William B. Pollock Company is one of them. Over the years Pollock has erected more blast furnaces than anyone in the world. We're specialists in heavy steel work, fully equipped to engineer and fabricate plate and structural requirements and do heavy machine work on castings and weldments.

Pollock engineers are at your service. Use them. They'll analyze your needs and suggest the most practical, efficient and economical solutions.

POLLOCK
Since 1863

The William B. Pollock Co.

YOUNGSTOWN, OHIO

Engineers • Fabricators • Erectors
Steel Plate Construction

BLAST FURNACES • HOT METAL CARS AND LADLES
CINDER AND SLAG CARS • INGOT MOULD CARS
CHARGING BOX CARS • WELDED OPEN HEARTH LADLES

Steel Inventories at a Glance

Northwest Automatic Products Corp.

Autos—Cutting to the bone.

Appliances—Cutting moderately.

Electrical Equipment—Steady levels.

Material Handling Equipment—Scattered reductions.

Steel Mill Machinery—Stocks fairly steady.

General Machinery — Some cutbacks starting.

Farm Equipment—Cutting slightly.

Oil Country Goods—Liquidating big stocks.

Stampings—Stocks being cut sharply.

Fasteners—5 to 30 per cent reductions.

Steel Warehouses—High stocks, slower turnover.

Defense Work—Widespread cutbacks.

Steel Stocks To Skid More

They're down, but only 1 million tons from year-ago level. Liquidation has been sharpest in wire, sheets, bars, stainless. Levels hold in heavy plates and line pipe, wide flange beams

STEEL INGOT production last week fell to about 1,770,000 tons—the lowest since 1954, except for strike or holiday periods.

What's the matter? A STEEL survey of 12 buying categories (see above) shows inventory liquidations going on in ten of them. Although some cutbacks are slight, they have been extremely sharp in autos and soon will be in oil country goods—two big consumers. Inventory buildup by steel warehouses has been largely involuntary.

Why Liquidate? — Many steel buyers are trimming stocks because: 1. Their business is down. 2. Virtually every steel product is readily available for the first time since 1954. 3. There will be no industry-wide steel strike in 1958.

Here's how buyers in the 12 categories are dealing with steel inventories:

Autos—Assemblers have 14 to 16 day stocks of steel, compared with 35-day levels one year ago. Detroit's and Wayne County's year-end taxes dictate some of the reduction. Among part suppliers, the trend is also down. A Chicago firm's stocks are less than half what they were a year ago on a tonnage basis. One hopeful note: Most suppliers agree with Midland Steel Products Co., Cleveland: Inventories need not go much lower.

Appliances—Inventories average around 60 days in the industry, but they're down from year-ago levels on a tonnage basis because production is lower. One medium-sized maker has only 58 per cent as much steel as he did 12 months ago. Rheem Mfg. Co.'s stocks are off 20 per cent.

Electrical Equipment—Minor reductions in this industry are explained this way: Manufacturers are overstocked with previously tight products, such as plates. One motor control maker says he has 40 per cent less tonnage on hand than he did a year ago, but he still has a 120-day supply.

Handling Equipment—New business of lift truck makers is off 10 to 20 per cent from last year's, but many find their steel inventories higher. Stock reduction is inevitable. But makers of conveyors find business holding well, so inventory adjustments are minor. American Monorail Co., Cleveland, has reduced tonnage slightly from its year-ago figure, but its dollar value remains the same.

Steel Mill Equipment — Mesta Machine Co. and United Engineer-

ing & Foundry Co., Pittsburgh, report no incentive to boost steel stocks although backlogs are still good. Adjustments are minor.

General Machinery—A welding equipment maker reports he's carrying 22 per cent less tonnage than he did a year ago. A machine tool builder has cut 25 per cent. A large construction equipment maker says his stocks are twice what they should be, but lower than they were a year ago.

Farm Equipment—One producer has enough steel for 50 working days, 5 per cent more than a year ago. He plans to cut to 40 working days.

Oil Country Goods—Small oil producers have cut supplies from four to two months in a year. Larger firms will trim six or seven-month stocks to the four-month level.

Fasteners—Steel reductions are widespread. A Cleveland firm's stocks are off 5 per cent from a year ago; a Chicago producer has cut 30 per cent; a Pittsburgh company aims to reduce by one-third.

Stampings—American Stamping Co., Cleveland, says: "Inventories are 28 per cent lower than they were a year ago." Northern Metal Products Co., Franklin Park, Ill., says: "Tonnagewise, inventories are half what they were a year ago." A Pittsburgh stamper says: "We haven't finished cutting."

Steel Warehouses—Turnover is the worry here. Most report it is at least 10 per cent slower than it was a year ago; some say it's as much as 30 per cent slower. Result: Most inventories are high.

Defense Work—Thompson Products Inc., Cleveland, mirrors the national opinion here: "We're much too heavy on steel for defense."

Big Question — The decline in steel inventories has been going on since last May. One year ago, stocks totaled about 20 million tons, after a 4-million-ton addition in 1956. By last May, they rose to 22 million tons. Now, they're at 19 million tons, still too high.

General liquidation will continue for at least the next six months. By mid-1958, steel stocks may reach about 15 million or 16 million tons. Then, you can expect liquidation to stop and, perhaps, the start of a buildup.

NAM Checks Business Pulse for '58

Of 4330 firms questioned on . . .

SALES

- 45% expect '58 to equal '57.
- 36% expect an increase.
- 19% expect a decrease.

PROFITS

- 46% expect '58 to equal '57.
- 21% expect a rise.
- 33% expect a decline.

CAPITAL OUTLAYS

- 55% will equal their '57 spending.
- 26% will spend less.
- 19% will spend more.

Percentages are approximate.

Business Forecast for '58

THE BIGGEST problems facing the businessman in 1958 will be taxation, labor power, labor costs, inflation, and centralization of too much power in the federal government. That's the consensus of the 4330 manufacturing firms that replied to a National Association of Manufacturers' survey.

While 81 per cent of the respondents expect their 1958 sales to equal or exceed 1957's, only 67 per cent expect profits to keep pace (see table). Few expect to spend more for expansion than they did in '57. As major barriers to expansion, they listed taxation, business uncertainty, increased costs, tight credit, and union demands.

Labor Legislation—Sen. Carl T. Curtis (R., Nebr.), told an NAM convention that legislation is needed on these points:

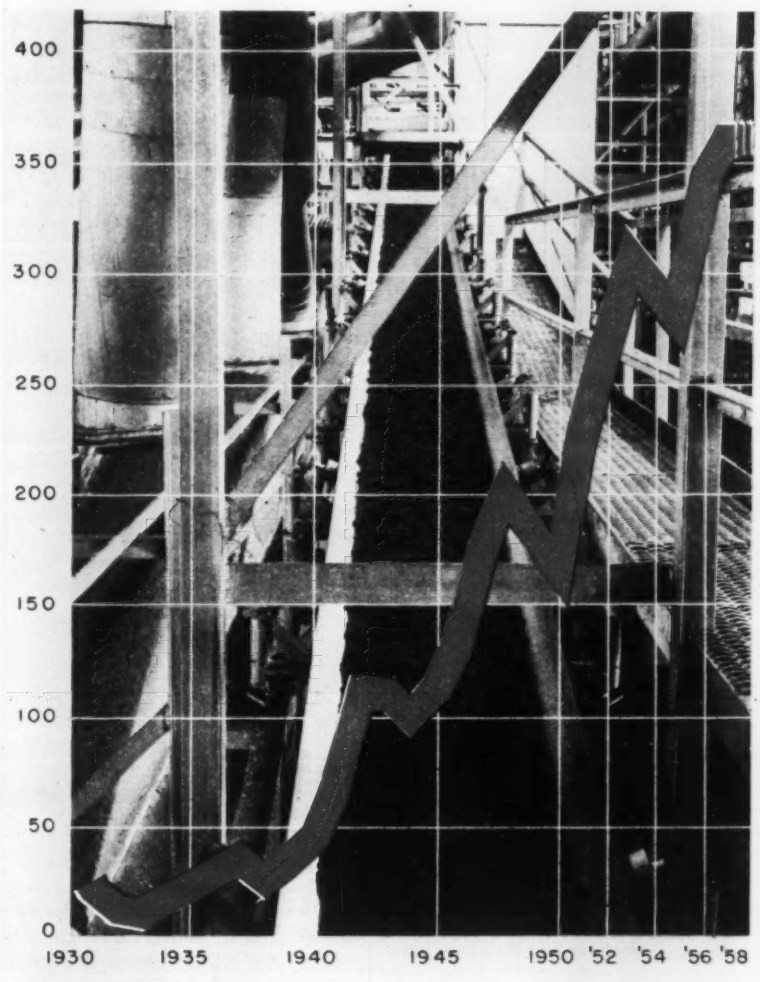
- To require a thorough accounting of union dues and welfare funds.
- To give rank-and-file union members more control.
- To outlaw the secondary boycott.
- To prevent use of union funds for political purposes.
- To impose restraint upon the concentration of union power.
- To enable the federal government to step in when hoodlums are transported across state lines or when violence occurs on a federally financed project.
- To stop compulsory union membership.

He said that annual union dues are estimated at $500 million and that unions have an estimated $25 billion to $30 billion in pension and welfare fund reserves.

Rev. John E. Coogan, chairman of the University of Detroit's sociology department, speaking in opposition to compulsory union membership, noted: "It is invalid by constitution, statute, or judicial decision in France, West Germany, Belgium, Holland, Denmark, Austria, Switzerland, Norway, and Sweden. The labor party in Australia recently decided to drop compulsory unionism from its platform. It continues unchallenged in only one country—Russia."

Tax Problem—In the survey, 34 per cent of the respondents listed taxation as the most important barrier to expansion. It was listed as 1958's biggest business headache by 27 per cent.

Industrial Conveyor Shipments High



Source: Conveyor Equipment Manufacturers Association. 1957 and 1958 estimated by STEEL.

Joy Mfg. Co.

Conveyors Hold Sales Gains

MANY PRODUCERS of conveyor equipment expect to set sales records in 1957 and equal or surpass them next year. They're getting a helping hand from emphasis on automation and cost cutting in such fields as metalworking, chemicals, warehousing, and food processing.

Explains one major producer: "Making substantial profits in the face of dipping sales and rising labor costs will be a common problem in 1958. It will be solvable only by improved productivity. Since our industry helps customers do this, I'm optimistic about the immediate future."

His optimism is shared by 60 per cent of the firms queried by STEEL. They expect an average sales gain of 11 per cent in '58. The other 40 per cent expect sales to be about 15 per cent lower.

Plus Factors—Constant development of new applications, booming sales of higher priced items, rising sales of new nylon items, expansion for efficiency, and aggressive marketing practices strengthen the outlook. Backlogs average 94 per cent of their year-ago figure. The industry is operating at about 90 per cent of capacity (range is from 50 to 100). Over 40 per cent of the firms queried are operating at full throttle. While incoming orders are slightly down from the year-ago level, they are up substantially from the third quarter pace.

Minus Factors—Some signs point to slower sales. Expansion programs are decelerating; there's a general sluggishness in the capital equipment market. Many customers have slashed their spending programs; others are in the "wait and see" category. Foreign demand shows signs of weakening. Competition from foreign firms in the export market is getting tougher, notes Link-Belt Co., Chicago. South America, Mexico, and Canada are the major foreign markets.

Who's Buying — Main markets for the nation's 130-odd conveyor makers are metalworking and chemicals. Food processing, mining, warehousing, and paper industries also are big buyers. Most firms feel that the chemical industry holds the best long-range potential, followed by food processing and metalworking. No field is near saturation. A. B. Farquhar Div., Oliver Corp., York, Pa., figures its best market will be retail trade.

In 1957, over 60 per cent of the industry's dollar volume came from systems placed in new plants. Systems for present plants show the best promise for 1958. Replacement sales are small.

The Conveyor Equipment Manufacturers Association reports that 82 per cent of the industry's dollar volume is concentrated in its 37 member companies.

Trends—Although specially designed systems account for 70 per cent of sales, there is a trend toward "off-the-shelf" items adapted to customer needs. Off-the-shelf items, as such, account for less than 10 per cent of industry sales. Tipp Mfg. Co., Tipp City, Ohio, is developing a system of all standard parts with modifications.

Conveyor makers smile with an-

ticipation when office automation is mentioned. One firm calls it "a relatively new market with a great undeveloped potential." Example: At IBM Corp.'s new Sherman, Tex., plant, a conveyor accepts cartons of punch cards from various stations, automatically segregates each customer's orders, and holds it in overhead storage until it's ready for shipment. Then a master control automatically selects individual orders, directs them through a case sealing machine, and delivers them into the proper truck or railroad car. It can handle more than a half million pounds of cards a day.

Makers Talk—Logan Co., Louisville, contends that the live-roller-type conveyor is growing the fastest because it's best adapted to long lines, distribution, and accumulation. It's also rugged.

Standard Conveyor Co., North St. Paul, Minn., cites a fine potential in electronic controls for automatic order picking. Universal transfer devices that are easily changed from one operation to another is a new development reported by Planet Corp., Lansing, Mich.

Sage Equipment Co. Inc., Buffalo, reports a trend toward storage racks built into conveyor lines. Conveyor Systems Inc., Chicago, will double its capacity by moving into a new plant in Morton Grove, Ill., next month.

A number of firms report that 1957 will be a bumper year for bulk handling equipment, including: Link-Belt and Materials Handling Equipment Co., Chicago; Fuller Co., Catasauqua, Pa.; Power-Curve Conveyor Co., Denver; and Joy Mfg. Co., Pittsburgh.

Most firms report that price increases do not appear likely in the near future.

New Uses—New London Engineering Co., New London, Wis., reports these unusual applications: Transporting hot lard, marbles of glass, ammunition boxes, and skinless frankfurters, and grading roses.

Carrier Conveyor Corp., Louisville, believes conveyor - coolers, dryers, dewaterers, continuous quenching machines, and leachers hold great promise. Metzgar Conveyor Co., Grand Rapids, Mich., reports building a conveyor to transport 3-ounce cartons by gravity only 70 ft with a 70 in. drop.

On the Farm—Dairies have long been a big market for conveyors. Recently, the concept has extended to dairy farms. Conveyor systems can transport a cow through all milking operations and transfer the milk directly from her to the cooler.

Summary — Speedways Conveyors Inc., Buffalo, sums up the future this way: "In a cost conscious market like today's, any labor-saving device, properly presented, must move ahead."

Handling Equipment Dips

Dollar bookings of material handling equipment in 1957 are about 10 per cent below the record levels of 1956, Robert L. Fairbank, new president of the Material Handling Institute and vice president of the Towmotor Corp., Cleveland, said in New York last week.

It will take hard selling to keep the sales curve from dipping more in 1958, Mr. Fairbank stated. It can be done by showing where savings can be made, he said, adding that price cutting won't get the business.

New types of equipment include trucks designed to handle large coils of tin plate and a floor-level conveyor for shifting materials.

MHI is conducting a vigorous educational campaign. Over 100 colleges now have material handling courses, compared with only 12 five years ago.

Towmotor Corp.'s R. L. Fairbank
. . . new MHI president

Other new officers of MHI are: First vice president, Eugene Caldwell, president, Baker-Raulang Co., Cleveland, and second vice president, C. L. Fell, vice president, American Monorail Co., Cleveland.

Moon Trips by '77?

Rocket society says manned lunar voyage will be made in 20 years. It asks federal space agency

SPACE flight to the moon in manned vehicles can be a reality within 20 years, delegates to the 12th annual meeting of the American Rocket Society in New York were told.

ARS officials disclosed that the group has asked President Eisenhower to form a new federal agency to initiate a long term space flight program. Estimates put its cost of formation at $100 million and its annual expenses at $200 million.

Future—The plan covers immediate goals running to 1983, plus long-range projects after that. The blueprint for the next 20 years includes: 1. Launching an earth satellite within five years which will carry instrument loads weighing up to 1 ton. 2. Sending instrument packages weighing one hundred to several hundred pounds to the moon within five to ten years. 3. Sending research comets to gather data in the regions between Venus and Mars within five to ten years. 4. Putting up manned satellites to circle the earth within ten years. 5. Dispatching manned vehicles to circle the moon within 15 years. 6. Launching expeditions to land on the moon within 20 years.

Other advances revealed:

- The U. S. is using air-breathing engines powered by solid fuel to launch defensive missiles.
- The first production-type rocket engine for the Titan ICBM has been delivered to the prime Titan contractor, Martin Co.
- Hydrogen derivatives of boron and beryllium are of interest as high energy fuels because of the high heat content of the metals themselves.

Jessop Steel Co.'s president, Frank B. Rackley, tells how . . .

Small Steelmaker Prospers

IS THERE ROOM for small, independent steel producers in the heavily competitive specialty steel field? Jessop Steel Co. thinks so. President Frank B. Rackley points to sales gains in 1955 and 1956 as proof.

New High—In 1957, Jessop has an excellent chance of beating last year's record of $24.9 million. The total for the January-September period this year is $19.6 million, a 10 per cent gain over the same period of 1956.

The Washington, Pa., producer of stainless, tool steels, high speed steels, and other premium products had sales of $11.4 million in 1954 and $16.4 million in 1955.

"A small steelmaker can prosper if it stresses research, market development, and new products," Mr. Rackley says. "Quality control and product publicity will help keep it a step ahead of its larger competitors. The independent company can enjoy a more flexible rolling mill schedule and maneuverability which a large steel corporation doesn't have. It can look for, and fill, the smallest orders."

Hardships Happen — Sudden drops in demand for specialty steel may plague a producer. Jessop officials point out that small firms can often operate profitably at a lower production rate than can larger corporations. They can realize profits in an "off" year. Jessop made money in 1954 on sales volume less than half that handled in 1956.

Growth a Must—The small steelmaker without vast capital reserves must often finance expansion by borrowing from commercial banks. This can cause trouble in a tight money era.

Jessop has no current capital problems. In fact, the company has "never stopped expanding in eight years," its president declares. "Our expansion aims at greater profits and new products. Increasing our tonnage is secondary," he explains. Jessop's tonnage has grown along with quality of product. Ingot capacity of the Washington plant rose from 33,490 tons on Jan. 1, 1954, to an estimated 40,000 tons in fourth quarter, 1957.

New Subsidiary — Jessop spent $750,000 at Green River Steel Corp., Owensboro, Ky., since acquiring it last June 30. It's now a wholly owned subsidiary, adding 200,000 tons to Jessop's ingot capacity.

Growth brings advantages—and new problems. An advantage: Green River had excess melting capacity but lacked finishing facilities; Jessop's rolling capacity was higher than melting capacity. The combination brought a balance. Problem: Build markets for the Kentucky firm's alloy steel.

Atomic Supplier—Jessop has enjoyed similar success in meeting changing market conditions. In analyzing one of his firm's growing markets, Mr. Rackley says: "An advantage of the small producer is being able to move quickly into special metal fields. We are supplying zirconium alloys, alloys containing boron, clad metals, titanium, and special bronze-base alloys to atomic industries."

Jessop sales officials say incoming business has increased for two months, following a steady inventory reduction by customers. With users' stocks low, the firm expects replacement buying to improve soon. Thanks to constant product improvement, Jessop's president reports: "We're optimistic about 1958."

What Supervisors Need . . .

"The foreman's job has become increasingly difficult. To meet the challenge of a bigger job, he wants all the help we can give him," says Republic Steel Corp. These are the personal development needs that Republic's supervisors voted most important:

Skill in How To . . .

1. Instruct and develop employees.
2. Get people to work together as a team.
3. Analyze job requirements.
4. Plan and schedule.
5. Build good relations and good morale.

Knowledge of . . .

1. Job descriptions.
2. How attitudes are developed; how they can be changed.
3. How loyalty and co-operation are achieved.
4. Current management problems.
5. How skills and habits are formed.

Junior Brass Attend Class

Republic Steel's foremen enter company sponsored programs, learn to deal with workers. Juniors at Thompson Products hear company policies explained by top executives

"FOR A BIGGER JOB, we need a bigger man," says Joseph S. Kopas, training counselor for Republic Steel Corp., Cleveland.

"Unless we bring our foremen up to date and keep them abreast of technological, social, and economic progress, we won't be able to increase productivity fast enough to offset rising costs," he warns.

With a gesture toward an ominous chart that plots the rising line of labor costs against the falling line of job performance, Mr. Kopas stresses the need for prompt remedial action: "Today's foreman must be better trained. He must be a better leader—more proficient in dealing with people and capable of exercising better judgment."

Republic's Program—In January, 1954, Republic inaugurated its Building Management Co-operation (BMC) program to help supervisors achieve better job performance through improved management-employee relations.

Developed with the assistance of the Industrial Relations Center of the University of Chicago, the BMC program has a twofold purpose: First, to challenge the individual supervisor and management in general to participate in an intensive program of self-development. Second, to answer the challenge by giving supervisors an opportunity to meet together and discuss common problems, and by so doing build teamwork in the management structure. Everyone in management from the operating vice president to the newest assistant foreman participates.

How It Works—The Industrial Relations Center develops a BMC session or study unit and presents it to Republic, which approves its content or suggests changes. Selected operating and maintenance superintendents are then brought to Chicago for a week's training in discussion leadership. They return to their plants to discuss the study unit with their foremen in groups of 15. Held on company premises and company time, the meetings take place once a week and last 1½ to 2 hours. The discussion leaders meet at Cleveland once a month to receive materials for the next session.

The BMC program has three parts: 1. "Determining Our Needs" (five sessions). 2. "Understanding Our Labor Agreement" (18 sessions). 3. "Fulfilling Our Needs" (ten sessions).

Last year, 51 discussion leaders held 1109 meetings at 26 plants. Enrollment was 4781, and attendance was 97.1 per cent.

Benefits—Commenting on the program's value, one member of the review committee says: "BMC is doing a good job. Foremen aren't being set back on their heels now by the union. They know more about the contract and are taking time to explain it." Another observes that "foremen are accepting more resonsibility and feeling more a part of the management team."

Because discussion leaders (plant superintendents) are pledged to respect the confidence of foremen, they're getting a better insight into the foreman's problems. What's more, they're able to communicate his needs to plant managers and to the operating vice president, if need be, through the review committee. In addition to benefiting foremen, the

What Supervisors Become . . .

"The basic test of the conference technique is how it motivates your junior executives," says Stacy R. Black, staff director of personnel development, Thompson Products Inc., Cleveland. Here's what happened to participants in Thompson's first Conference Group in Management Practices:

Position—February, 1950	Position—September, 1957
1. Budgetary Control Engineer	Manufacturing Mgr., Michigan
2. Sales Engineer, Accessories	Division Mgr., Pneumatics
3. Industrial Engineer	Left Company
4. Personnel Mgr., Michigan	Same position
5. Editor, House Organ	Asst. to Advertising Mgr.
6. Industrial Engineer	Factory Mgr., Light Metals
7. Assoc. Dir. of Purchases	Division Purchasing Agent
8. Industrial Engineer	Division Mgr., Electronics
9. Accountant, Staff	Supervisor of Accounting, Jet
10. Development Engineer	Product Eng. Mgr., Accessories
11. Asst. Sales Mgr., Michigan	Left Company
12. Chief Engineer, Valves	Left Company
13. Project Engineer, Staff	Assoc. Staff Dir., New Devices
14. Asst. Mgr., Spec. Products	Vice President & Division Mgr.
15. Sales Engineer, Jet	Division Sales Mgr., Jet
16. Sales Mgr., Spec. Products	Left Company

BMC program has developed the leadership skills of superintendents, plant managers report.

Internship—As a counterpart to BMC, Republic sponsors a training program for new supervisors, entitled "Four-Year Internship in Management." Inaugurated in March, 1956, it is a product of Cleveland's Human Engineering Institute, a nonprofit research organization directed by Mr. Kopas.

There are three objectives: 1. To establish standards of performance for supervisory work and help each new supervisor attain them. 2. To help discover supervisors who have superior ability, ambition, and leadership qualities so that they may be given an opportunity for advancement. 3. To provide the necessary development opportunities at a time when they mean the most.

Although participation is not mandatory, about 90 per cent of the foremen appointed in the Cleveland district since the program's start have enrolled. All sessions are held at the institute, and participants receive no pay for their attendance. Each group of 11 or 12 men attends one 2-hour session a week. Discussions are led by members of the institute staff. Since a year's work consists of six 10-hour study units (five 2-hour classes), the classes run for 30 weeks each year.

Curriculum—Study units define supervision and explain its functions. They're aimed at making the foreman an effective leader and increasing his understanding of the personnel factors, operational factors, and administrative functions that are related to his job. The first year's topics include: What Is Supervision? How To Achieve a Good Safety Record, Rules of the Game, Placing the Right Man on the Right Job, Creating a More Productive Work Force, and Understanding People.

At present, internship is a pilot program limited to the Cleveland district. To date, 45 newly appointed supervisors have participated.

Thompson's Program—Another approach to management development is the Conference Group in Management Practices, a program developed by Thompson Products Inc., Cleveland. In operation since 1950, it brings promising younger men into contact with the company's top executives through a series of 11 monthly meetings.

How It Works—In June, Stacy R. Black, staff director of personnel development, invites division managers and staff heads to nominate members for the conference program beginning in the fall. He asks them to consider: 1. Those whose potential ability or performance either before or after joining the company gives high promise of an unusual contribution. 2. Those who now hold jobs of more than ordinary responsibility, whose training would help them give more valuable performance. Candidates are usually college graduates between 23 and 36. Enrollment is normally limited to 50 men.

A typical session begins at 4 p.m. with the introduction of a top executive, who speaks informally on one phase of the business. He may describe current problems and illustrate his remarks with slides. At 5:45, the conferees move to the company cafeteria, where they're free to continue their discussions. They return to the conference room for a question-and-answer period and adjourn at about 8.

Curriculum—Normally included in the one-year program are these topics: Business Fundamentals, Financial Planning and Control, Business Organization, Thompson Selling and Advertising, The Engineering Function, Financing the Business, Human Relations - Personnel Administration, Business and Law, Principles of Purchasing, Industrial Engineering, and Accounting.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Small Business Champions Speak

THE NAVY comes off best in the latest report of Sen. George Smathers' (D., Fla.) Government Procurement Subcommittee, but that isn't saying much. The subcommittee, the Senate's watchdog over small business' share of the defense dollar, charge the Pentagon with general inactivity on this front.

The Navy gets special mention because it has reversed the trend away from small business contracts and increased the number of contract set-asides in this category.

Because the Army's buying program lends itself to small business suppliers more than the Navy's and Air Force's, the subcommittee thinks the Army is satisfied to rest on its laurels. However, the Army's share of awards to small companies dropped from 43.7 per cent in fiscal 1956 to 40.6 per cent in fiscal 1957. The Navy's share moved up, while the Air Force's has stayed about the same.

Subcommittee Hits Air Force Hardest

Being the largest hardware buyer of the three services, the Air Force comes in for special attention by the subcommittee. A spokesman says: "We find it hard to fathom the true attitude of the AF." Some of its actions are contradictory. For example: The AF launched a program among 15,000 banks to assist small companies wanting prime contracts, but it also told the subcommittee that small firms are best suited for AF work as subcontractors.

The Senate group isn't just concerned with the present situation. It knows matters will tend to get worse, as more hardware dollars go into missiles, and asks for a "dynamic new approach."

Hearings by the subcommittee in 1958 will get testimony from the usual witnesses (Defense Department procurement secretaries and military chiefs), a number of contracting officers (the fellows with whom the small companies must deal directly), and the Pentagon technicians who draft the requirements for basic military items.

Small Firms' Lot Could Be Improved If...

Highlights of the subcommittee's recommendations for action in 1958:

1. Standardization of small business procedures of the three services.

2. Access of Small Business Administration personnel to classified procurement. (The Army does not check classified procurement for small business awards.)

3. Less letting of awards by amending the original contract. (About 14 per cent of the dollar value of the Navy's awards are done by amendment.)

4. Attention to the middle management group of contracting officers, buyers, negotiators, and technicians who remain "indifferent" to small business problems.

As the subcommittee's report went to press, letters continued to come in from small outfits losing their defense business. A spokesman reports the situation has not changed since pre-sputnik days. Any changes that have been made in our Defense program since sputnik remain confined to the high planning level. They do not affect the daily operations of small business.

Despite the subcommittee's good intentions, 1958 doesn't look like a better year for the participation of small firms in defense business. The swing to missile production will be too slow to help much, and the need for speed will tend to make the services overlook opportunities to award contracts to small firms.

Missile Inquiry Pace Is Slow

Sen. Lyndon Johnson's (D., Tex.) Preparedness Subcommittee investigation of our missile program is not turning up anything new. Washington dopesters are guessing the fireworks will come from Rep. Carl Vinson's (D., Ga.) Armed Services Committee inquiry in January.

Senator Johnson's position remains calm in spite of the demand from some Democrats to dig just deep enough to throw a little dirt on the Republicans. But he is moving with caution, confining testimony to nationally recognized scientists for the most part.

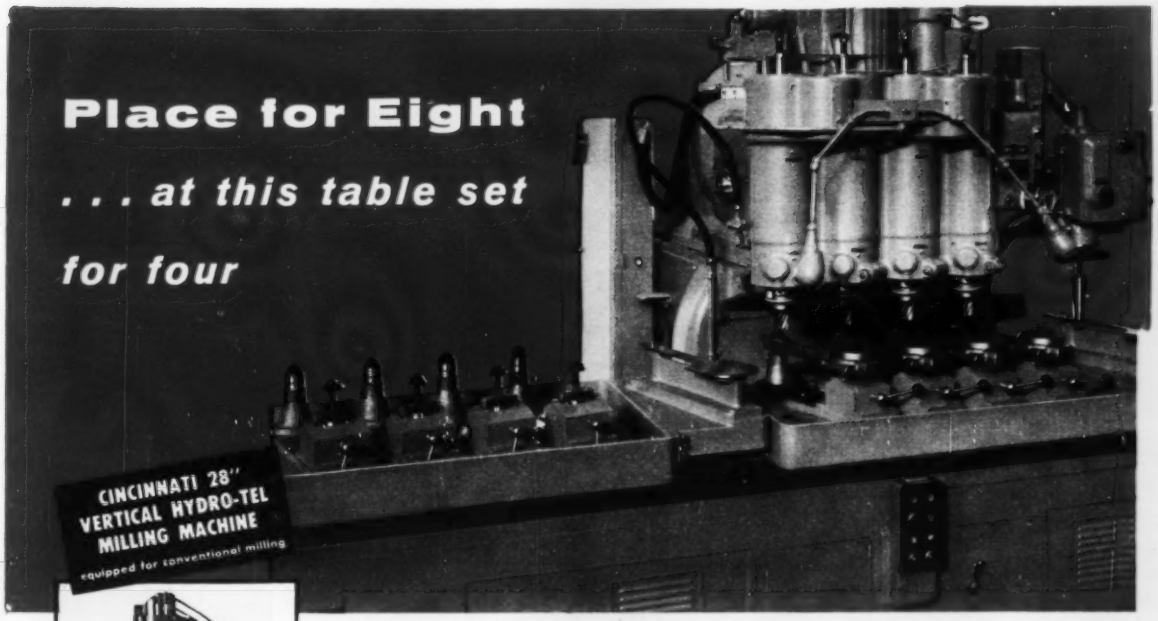
Rep. George Mahon's (D., Tex.) Defense Appropriations Subcommittee is spending most of its time with official Pentagon sources. Secret testimony so far has not appeared to upset subcommittee members too much.

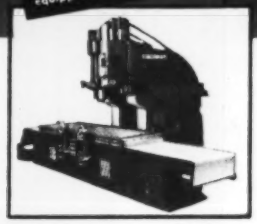
Consensus: The missile program is a little too hot for either party to handle easily because both administrations (Truman's and Ike's) were caught way off base. We may never know anything more than we need to know. That is: The Russians are ahead of us.

Straws in the Wind

• Ford Motor Co. has lost a $9-million suit in a U. S. Court of Claims for the refund of excise taxes. Ford felt it was entitled to deduct from the sales price the cost of making warranty replacements, but the court says the warranty costs were spent to fulfill company assertions that its cars are sold free of defects.

• Sen. Prescott Bush (R., Conn.), returning from a European tour, says American manufacturers should make smaller cars to compete with imports. He adds that unless more small cars are made here, the U. S. may have to impose a tariff on foreign cars.





It's an established principle for methods engineers in the "know" . . . while one or a group of parts is feeding past the cutters, a second fixture mounted on the machine is reloaded for its turn at the feeding station. In many cases handling time chargeable to cost is practically nil. ¶Advantages of this principle are very much worth while for the milling operation illustrated here. A CINCINNATI® 28" Vertical Hydro-Tel, with 96" table traverse, is equipped with duplicate fixtures and a four-spindle head to automatically profile mill four connecting rods at one time. Surfaces milled are indicated in the drawing. This Hydro-Tel is equipped for 360° automatic profile milling, one of the seven ways in which Hydro-Tel machines are built for various types of work. The complete list includes:

1) Conventional milling, low series spindle speeds
2) Conventional milling, high series spindle speeds
3) Die sinking
4) 360 degree automatic profiling, non-selective
5) Die sinking and 360 degree automatic profiling, non-selective
6) 360 degree automatic profiling, selective
7) Die sinking and 360 degree automatic profiling, selective

Drawing of part. Surface outlined is automatically profile milled in one continuous cut.

28" Vertical Hydro-Tels have plenty of range for large work; 60", 96" or 120" table traverse; single spindle head or 2, 3 or 4 spindles. May we give you more information? Write for catalog M-1773-2. For brief specifications look in Sweet's Machine Tool File.

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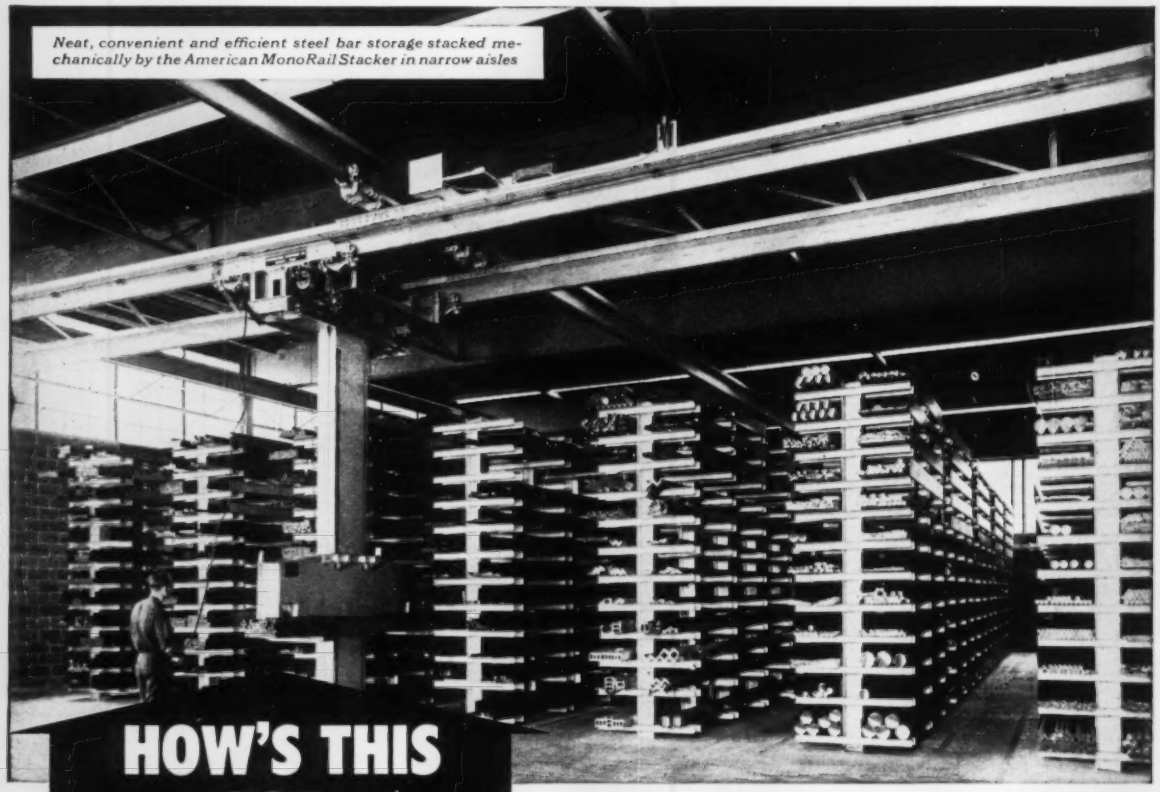
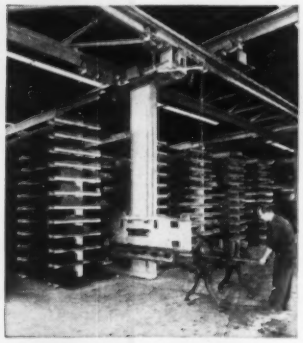
Neat, convenient and efficient steel bar storage stacked mechanically by the American MonoRail Stacker in narrow aisles



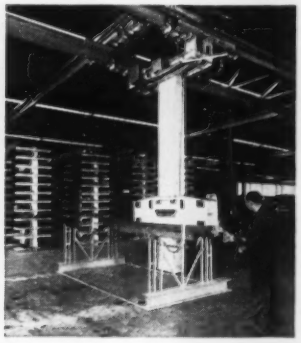
HOW'S THIS FOR STEEL STORAGE!

American MonoRail engineers, working with Hawkridge Brothers Company, designed this system for storing bars, rods and other long steel shapes.

Note the extremely narrow aisles and maximum height of racks. Bars and rods, 20-22 feet long, are placed in pans 18 feet long. The American MonoRail Stacker transfers these pans to either side of an aisle for storage.



MonoRail Stacker forks support bar in saw. Saw with extension rolls to any convenient spot in the warehouse.



American MonoRail Stacker lowers a banded bundle of bars over prongs which ingeniously splits bands, lets bars roll into trough for pick-up in a tray.

Photos: Courtesy of Hawkridge Brothers Company, Waterbury, Conn.

Member of Materials Handling Institute - MonoRail Association

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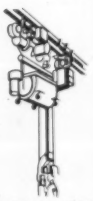
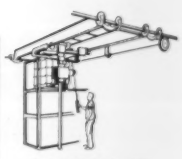
COMPANY

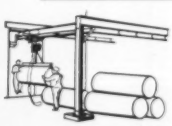
13102 ATHENS AVENUE, CLEVELAND 7, OHIO (IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.)



AUTOMATIC DISPATCHER



STACKER CRANE



MANUAL MONORAIL

RETRACTABLE CRANE

How Much Scrap Do You Produce?

Check It Against These Industry Figures

SIC No.	Industry	INDUSTRIAL SCRAP GENERATION (As percentage of material consumption) Iron & Steel	Copper	Aluminum
19	**Ordnance & accessories**	**25.0**	**25.3**	**17.9**
25	**Furniture & fixtures**	**11.4**	**n.a.**	**10.1**
33	**Primary metal industries**	**25.7**	**n.a.**	**n.a.**
34	**Fabricated metal products**	**12.1**	**29.1**	**13.7**
341	Tin cans & tinware	11.6	n.a.	18.0
342	Cutlery, hand tools & general hardware	22.8	44.9	18.3
344	Fabricated structural metal products	5.6	8.2	9.1
346	Metal stamping, coating & engraving	30.8	23.0	21.3
347	Lighting fixtures	19.2	21.6	n.a.
35	**Machinery (except electrical)**	**18.9**	**20.2**	**12.0**
351	Engines & turbines	22.0	13.0	12.7
352	Tractors & farm machinery	18.0	20.9	8.8
353	Construction & mining machinery	20.1	21.1	n.a.
354	Metalworking machinery	20.7	22.7	n.a.
357	Office & store machines	34.0	n.a.	11.0
36	**Electrical machinery, equipment & supplies**	**23.0**	**14.3**	**15.4**
361	Electrical industrial apparatus	20.5	13.3	15.9
362	Electric appliances	26.5	20.9	12.5
364	Engine electrical equipment	39.1	15.0	19.7
366	Communication equipment	24.6	15.7	n.a.
37	**Transportation equipment**	**28.9**	**18.8**	**28.7**
371	Motor vehicles & equipment	30.3	18.4	17.3
372	Aircraft & parts	30.1	17.9	39.0
373	Ship & boat building & repairing	25.6	n.a.	n.a.
374	Railroad equipment	14.8	15.8	23.9
	Average (all industries surveyed)	19.4	20.3	18.4

Source: Business & Defense Services Administration's report, "Industrial Scrap Generation." n.a.=not available.

IF YOURS is an average metalworking plant, about one-fifth of the iron, steel, copper, and aluminum that comes into it goes out as scrap. The average scrap generation ratios for metalworking are 19.4 per cent of iron and steel, 20.3 per cent of copper, and 18.4 per cent of aluminum, reports the Business & Defense Services Administration.

Big Scrappers—About 40 per cent of all iron and steel scrap come from the motor vehicle and parts industry, over one-fourth of the aluminum from the aircraft industry, and almost one-fourth of the copper from makers of valves, fittings, and plumbing fixtures. The table (left) shows the industry breakdown. You can get a complete report from the Superintendent of Documents, Washington 25, D. C., for 30 cents.

Vary with Size—Plants employing 250 or more generate 81 per cent of the iron and steel scrap, 70 per cent of copper, and 78 per cent of aluminum. Michigan plants alone produce over one-fourth of the iron and steel scrap, Ohio plants about 19 per cent. Illinois, Connecticut, and New York plants generate over 25 per cent of the copper scrap. Fabricating industries annually produce about 11 million tons of iron and steel scrap, 240,000 tons of copper scrap, and 170,000 tons of aluminum scrap.

And Industry — The structural and ornamental work industry scraps only 4.6 per cent of incoming iron and steel, while the ball and roller bearing industry scraps 53.6 per cent. Of industries working with copper, makers of electrical welding apparatus scrap the least (4.9 per cent) and producers of screw machine products the most (47.3 per cent).

And Type of Material—Reflecting the high proportion of light flat-rolled products used in manufacturing, BDSA reports that about 40 per cent of all prompt industrial scrap was in the form of bundles. Heavy melting grades made up only one-fifth of the total.

FOREIGN OUTLOOK for 1958... No. 2

This 89-ft ship's boom was produced by Phoenix Rhein-Rohr AG, Dusseldorf

West Germany Levels Off

Exports are down from peak of recent years due to rising cost and competition. But domestic demand, Euromarket, and U. S. investments make outlook bright

THE SIX-YEAR boom in West Germany (it started with the Korean War) will likely continue into 1958 but slightly reduced.

Some factors may presage a mild dip, but the new year bids fair to be a prosperous one.

Exports, which have kept the metalworking industries comfortably in the black in recent years, slowed down some in October in the face of rising wages and costs in West Germany and increased competition from other countries (STEEL, Oct. 7, p. 131).

Spiral—During 1957, ore prices rose 10 per cent, adding $5 million to annual production costs. Increased scrap prices added another $6 million. Coal and coke prices rose toward the end of the year for an addition at the rate of $6 million. A wage hike of 10 per cent and a workweek shortened from 45 to 42 hours is expected to add another $4 million. So the West German metalworking industry faces 1958 with more than $20 million additional costs.

Exports to Latin American countries have slumped as well as those to Indonesia, India, and other countries in Europe. West German steel prices went up 3 to 5 per cent during 1957, making French and British competition stiffer in the world market.

Historically, Germany has traded with Russia. Last year, the Soviets proposed a five-year trade pact. They want German oil pipe and machine tools. Chancellor Konrad Adenauer has given no answer.

Ace in the Hole—Fresh from his thumping re-election, Mr. Adenauer is getting pressure from some supporters among the industrialists to consider a deal with the Russians. If the German economy begins to slide in 1958, trade with the Soviets may become more attractive.

However, metalworking companies (and others) for several years have invested more than 40 per cent of profits in modernization and expansion. Total exports will reach $9 billion this year. Christmas buying is brisk and the domestic market is generally firm. Steel production will hit 25 million tons. West Germany's balance in the European Payments Union is $6 billion (enough to pay for all imports for eight months).

Look to U. S.—The larger steel companies and other metalworking firms have formed close ties to U. S. firms, and more agreements are being worked out every day (see list). Currently, straight exports from the U. S. account for most of the American products.

Scramble Inside — With Euromarket, the six-nation common market (STEEL, April 8, p. 69) formally coming into existence in January, more U. S. firms are setting up partially owned or wholly owned companies and plants in West Germany (as well as in France, Holland, and Italy).

Object: To operate inside the area that will become tariff-free over the next 17 years. The six nations will soon adopt a common tariff on all imported goods. They will average tariffs as a first step.

Pilot Operation — Here's what can be done by international cooperation: Late this year an agree-

U. S. and German Firms Form Business Ties

Here are a few of the many U. S. companies that have working arrangements with German firms, and their respective contacts. Most arrangements are licensing agreements, but others are for exchange of technical information, joint ownership, and sales agencies.

U. S.	GERMAN
Armco Steel Corp., Middletown, Ohio	August Thyssen-Huette AG
American Pfaff Corp., New York	Pfaff Nahmaschinen
Baldwin-Lima-Hamilton Corp., Philadelphia	Maybach Motorenwerke AG
Blaw-Knox Co., Pittsburgh	Friederich Krupp AG
Chemargo Corp., of Pittsburgh Coke & Chemical Co., Pittsburgh	Farbenwerke Bayer AG
Deere & Co., Moline, Ill.	Heinrich Lanz AG
Diesel Energy Inc., New York	Koln-Deutz-Humboldt-Motoren
Fluor Products Co., Whittier, Calif.	Maschinenfabrik Hartmann AG
F. H. McGraw & Co., Hartford, Conn.	Chemische Kalwerke
International Tel. & Tel. Corp., New York	Standard Elektrizitats AG; Suddeutsche Apparatefabrik; C. Lorenz AG
Otis Elevator Co., New York	Flohr-Otis GmbH
Ringler-Dorin Inc., New York	Dornbusch & Co.
R. L. Carlisle Chemical & Mfg. Co., Brooklyn, N. Y.	Ultramarinwerke AG
Rhinetubes Inc., Houston	Phoenix Rhein-Rohr AG
Studebaker-Packard Corp., South Bend, Ind.	Daimler-Benz
Terrell Inc., Charlotte, Va.	Schlafhorst GmbH

ment was reached for a French firm to produce a special steel under U. S. license for use by a German company.

Compagnie des Forges de Chatillon, Commentary et Nueves Maisons of France, will use a process of Armco Steel Corp., Middletown, Ohio, to produce oriented, electrical steel sheets for August Thyssen-Huette, big German steel firm.

Thyssen-Huette will provide the French company with hot rolled, heat resistant coils. Chatillon, Commentary will ship the oriented, electrical sheets back to Germany for exclusive distribution in that market by Thyssen-Huette.

Momentum — West Germany (along with other parts of the world) enters 1958 with industrial activity below the peak of recent months. Hower, heavy plates are scarce and order backlogs are heavy. Phoenix Rhein-Rohr AG had to import 55,000 tons of heavy plates from the U. S. last month to keep delivery dates for large tubes.

The steel industry has become highly diversified and the home market has demand for most steel items. If employment goes any higher, a labor shortage will result. U. S. investments and the possibilities of Euromarket create a healthy outlook.

Belgium Is Gloomy

Important export markets are cut as other countries limit their steel imports

BELT TIGHTENING by West European countries to improve their import-export balance is having an adverse effect upon Belgian industry as the year draws to an end.

Relying heavily on exports, the Belgian (and Luxembourg) economy faces reduced activity for the first months of 1958. There is hope that the Brussels World Fair (contracts for which have already been let) will stimulate foreign business.

Difficulties—While over-all production for 1957 was high, the rate dropped considerably in the closing months. Unemployment has increased, especially in the metalworking industries, and retail prices are still going up, dampening hope of heavy Christmas buying.

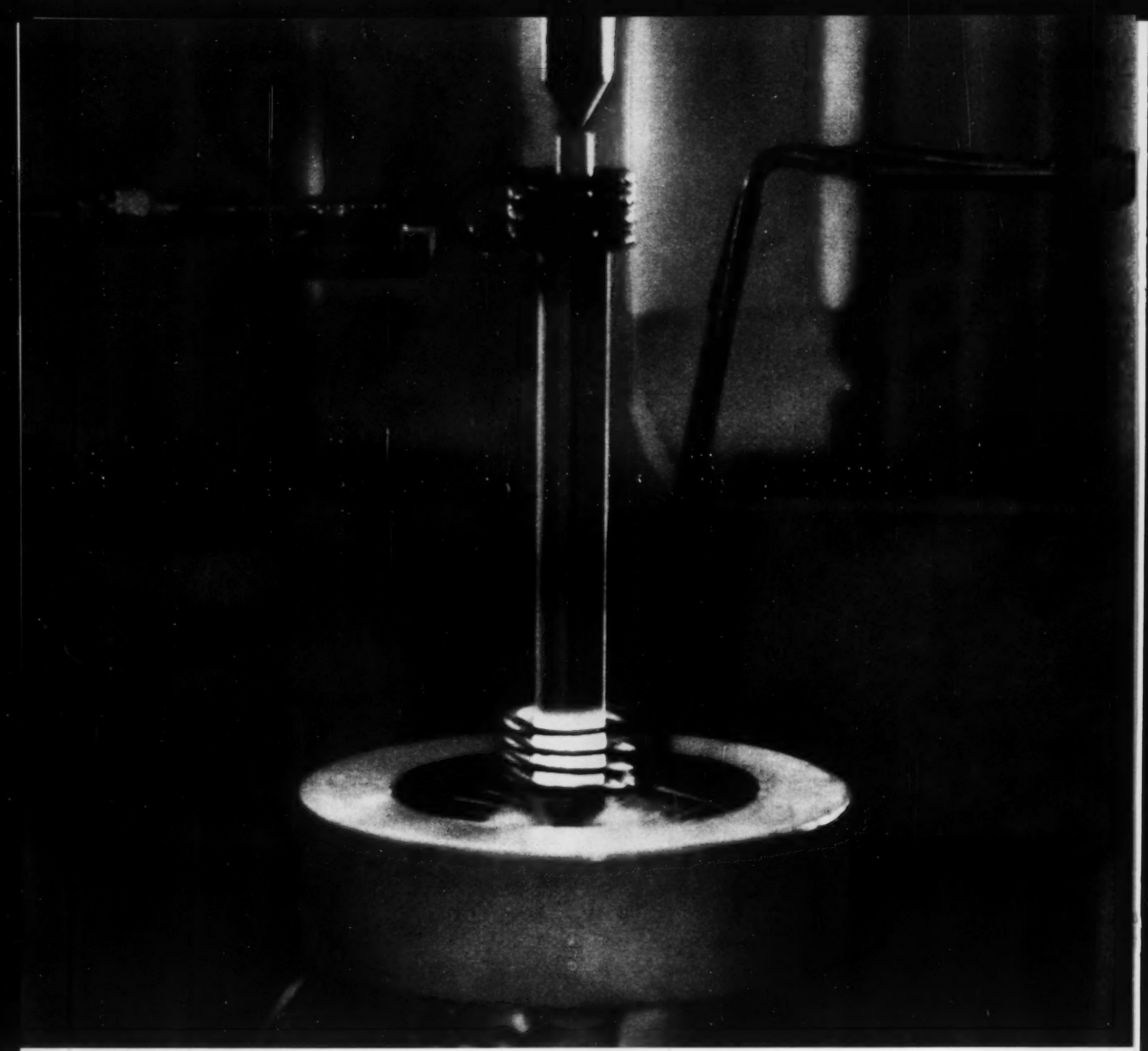
Imports by Belgians diminished during 1957 but their value remains much greater than that of exports, causing an adverse foreign exchange balance. Orders for steel from France and Germany, previously at a high level, have fallen to a trickle. Domestic demand is also low, except for some wire rods, plates, and sheets.

Other difficulties: 1. The 20 per cent import tax France placed on steel until the franc was devaluated. 2. Reduction of orders from the Scandinavian countries. 3. Credit restrictions in Holland. 4. Stepped up competition from Japan and Germany, not only in export markets but in Belgium.

In 1956, the monthly average of orders booked was $57.2 million in exports, and $84.8 million in the domestic market. In the first half of 1957, the monthly average for export orders was $50.7 million; domestic orders averaged $83 million. By July, the monthly average of export orders had dropped to $34.8 million; domestic orders were down to $65.9 million.

Except for a slight spurt in August, the rate continued to drop during the remainder of 1957.

Effect of the six-nation common market, which begins in January, is uncertain as the year ends.



Ketos shaft being induction hardened to Rockwell 55-56, while ends remain soft for final machining. Photographed at Control Instrument Co., Inc., Brooklyn, N. Y.

KETOS has wide hardening range with minimum volume change...

Ketos is a low priced alloy tool steel that can be hardened from low temperatures with practically no volume change. It has deep hardening qualities, and a fine grained structure, that make it desirable for many production parts.

That's why nondeforming Ketos is well suited not only for most tool steel applications such as gauges, dies, and taps but also for close-tolerance, wear-resistant parts like the actuator bar shown in the induction heating unit above. The thin contact edges of this particular part withstood a "life test" of over 4-million high speed blows. No other steel tested lasted more than 1-million cycles before it chipped and failed.

If Ketos sounds like the steel you should be using, call your nearby Crucible warehouse. Stocks of Ketos and dozens of other special tool steels are large, delivery fast. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor—Railway & Power Engineering Corp., Ltd.

Prototype Die Use Grows

Complicated designs and sweeping model changes make hand-built pilot pieces too costly. Automotive industry turns to zinc alloy and other materials for prototype tooling

AMORTIZING tooling costs is tougher these days. More complicated designs make for higher priced tooling, and annual model changes tend to cover more than grilles, fenders, and lights.

In one small area, the auto industry has turned to plastic and zinc alloy dies to cut down on the cost of making prototype parts by hand. Chrysler, for example, is estimated to have saved $2 million on prototype tooling for 1957 cars. The $7 million it reportedly is spending on such tooling has to be paid off before the company brings out another body in 1960. This figure presumably includes prototype tooling for '58 and '59 cars.

Starter—Although the potential of zinc alloy and plastic tooling was investigated during World War II, it didn't catch on until Korean War shortages forced automakers to seek substitutes.

The industry was also becoming increasingly aware that more sweeping annual changes make for more sales. Engineers started looking for ways to make revisions less costly.

General Motors Corp. began making prototype dies in its own shops. Ford Motor Co. switched from hammer forms to prototype dies in 1951. Chrysler didn't get into the act until '57 cars were being engineered. Since then, the prototype business has zoomed.

Sample—Richard Bros. Die & Prototype Div. (Allied Products Corp.), Hillsdale, Mich., estimates its share of the prototype business for the auto industry has increased 400 per cent since 1951.

William J. Esdale, manager of the division, points out that prototype dies cost as much or more than tooling for handmade parts, but the parts will cost less on a per piece basis.

"If you're making six pieces and have no need for stress analysis or test results, it might be less costly to do it by hand, but if you want 15 or more, some type of die almost always is a must," he says.

That's important today because automakers no longer build half a dozen prototypes just to see how they look. The companies may turn out 100 cars for test and design purposes.

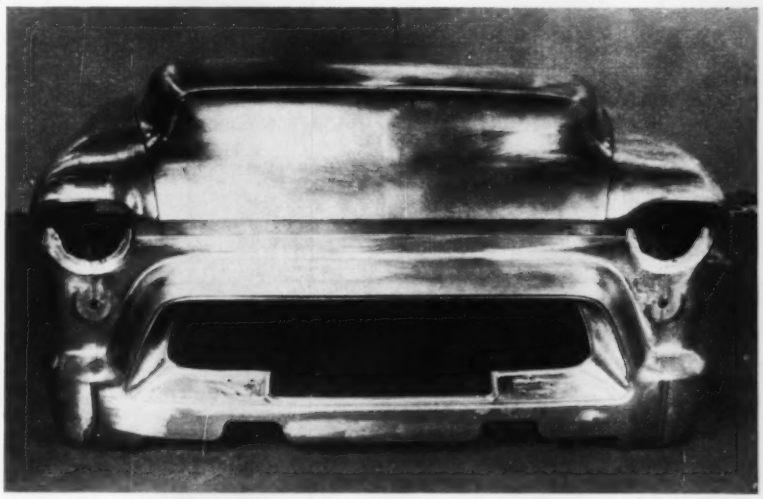
Quality — Such preliminary checks cut down on the amount of time and money involved in correcting mistakes on pilot runs and even after production starts. So prototype cars must be built to accurate specifications. Handmade parts aren't too satisfactory because each piece is slightly different from the next.

One of the car companies figures it has spent around $42,000 in prototype tools for a 1958 front fender. Says a divisional tool engineer: "We used zinc-alloy dies and trimmed the parts by hand. If we had done the whole job on hammer forms, our tooling might have cost us half as much, but we couldn't have built all the parts we needed in time to do us any good."

Quantity—Mr. Esdale agrees: "Under a handmade part program, it might take four to six weeks to produce a satisfactory hammer form for a floor pan, and parts would come off at the rate of one or two a week. Using prototype dies, the first floor pan might not be available for 10 or 11 weeks, but after that other parts would follow at a rate of five to eight a week."

Ability to turn out quality parts in a relatively short time is a basic criterion in prototype work where last-minute changes are the rule.

Types—Mr. Esdale adds that many persons confuse plastic, plastic faced, and zinc alloy dies. Plain plastic (epoxy) doesn't hold



The close fit between parts of this prototype truck front end shows the quality achieved in using zinc-alloy-plastic dies

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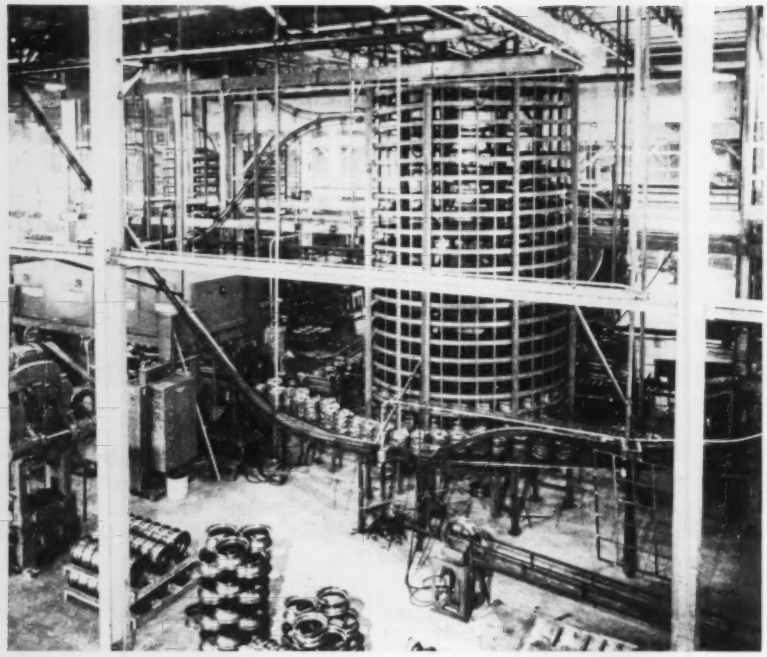


Motor Wheel Corp. Uses Vertical Storage Units

This spiral-shaped bin holds 1000 wheel rims which are top loaded and gravity fed to the production line through overhead conveyors. The unit is in Motor Wheel Corp.'s 85,000 sq-ft Newark, Del., plant

up for draw dies, say the auto firms.

Most prototype work calls for zinc-alloy base dies with a plastic face. They commonly are used for making 80 to 100 parts, such as hoods, fenders, and door panels. Plastic faced dies seem to work well with sheet steels up to 0.045 in. thick. For heavier gage parts like front pillars and bumpers, zinc-alloy dies hold up better.

Zinc-alloy dies also are being used more for short production runs of around 15,000 pieces—although even here it often is cheaper to use iron dies. Chrysler was producing Imperial roofs on zinc-alloy dies but scrapped them when Imperial production skyrocketed from 5500 to more than 30,000 units annually.

Using a zinc-alloy die punch with an iron binder ring, Richard Bros. is producing 14-ft hearse roofs. Die life is running 10,000 to 12,000 pieces over three years.

The industry is investigating the possibility of getting slightly longer die life by using Gmoodie, a zinc-base alloy developed by GM (STEEL, May 20, p. 156).

6 Million Sales Likely

Automobile sales will be about 6 million units this year and should be about the same in 1958, says J. O. Wright, Ford Motor Co., vice president and general manager of the Ford Div.

Here's how production shapes up through November:

U. S. Cars (Thousands)

	'57	'56
GM	2,525	2,782
Ford	1,739	1,481
Chrysler	1,148	760
AMC	100	94
S-P	69	81
Totals	5,581	5,198

U. S. Trucks (Thousands)

	'57	'56
GM	389	413
Ford	313	279
Dodge	71	83
Studebaker	9	12
Totals	782	787

Sales Ease—Sales seem to be falling slightly behind as the introductory rush of new business eases off.

The daily selling rate for the second ten days of November ran 17,000, compared with 18,000 for Nov. 1-10. In the second ten-day stretch a year ago, 19,600 cars were peddled daily.

Only about 118,000 to 120,000 of the '57 models still have to be sold by the end of the year; so much of the slump apparently is coming from '58s. Partly as a result of this, some divisions are scheduling production cutbacks for January. As STEEL goes to press, Ford and Buick divisions are reported to have cut January output schedules around 22 per cent. Oldsmobile also is down an unspecified number of cars for January output. GM's Detroit Transmission Div. reportedly has knocked 30 per cent off its purchasing commitments for January and February on certain steel items.

Even though January may be slower than anticipated, the industry still is not pessimistic about next year. Mr. Wright points out consumer buying power is up 0.5 per cent from what it was a year ago. This, plus easier credit, is expected to keep 1958 sales around the 6-million mark.

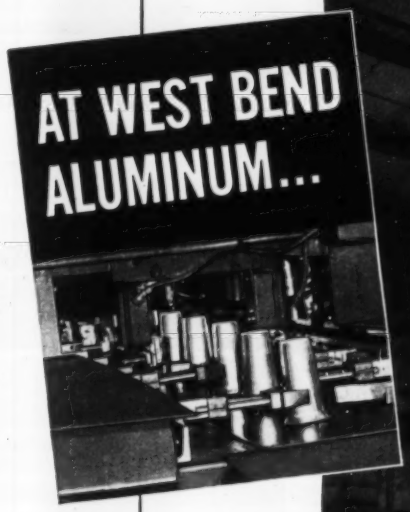
U. S. Auto Output

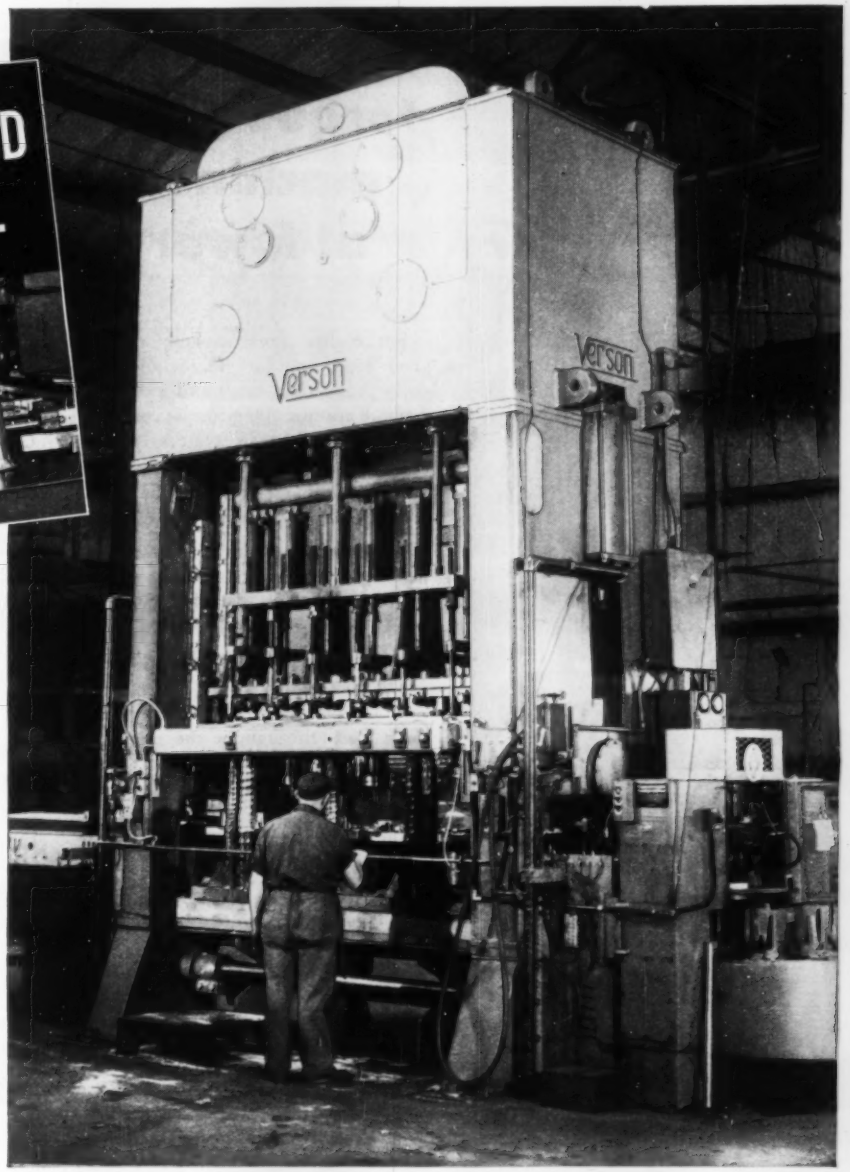
Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,619
May	531,365	471,675
June	500,271	430,373
July	495,629	448,876
August	524,354	402,575
September	274,265	190,716
October	327,362	389,079
November	578,601	580,803
11 Mo. Total	5,573,099	5,204,650
December		597,226
Total		5,802,808

Week Ended	1957	1956
Nov. 9	136,742	132,087
Nov. 16	141,902	135,641
Nov. 23	151,846	118,949
Nov. 30	114,795	159,976
Dec. 7	143,064†	167,576
Dec. 14	148,000*	158,431

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.





THIS 200 TON Verson TRANSMAT PRESS Performs 6 Operations

•

Produces 800 Tumblers Per Hour Automatically

In use at West Bend Aluminum Co., West Bend, Wisconsin, this Verson Transmat Press produces 10 ounce tapered aluminum drinking tumblers at the rate of 800 per hour, automatically.

3003 aluminum alloy blanks, .025 x 8½" diameter, are fed into the press by a blank feeder. The piece is moved by mechanical fingers through the 6 stations of the press.

The 1st, 2nd, 3rd, and 4th stations perform full draws of 30%, 26%, 24%, and 16% reductions. The 5th draw is a 21% reduction, but only 1¼" deep. A forming operation in the 6th station completes the tumbler except for trimming and buffing.

If you must produce 4000 or more identical stampings daily requiring four or more operations, Verson Transmat Presses can definitely lower your production costs. Let us show you how. Send outline of your requirements.

170

A Verson Press for every job from 60 tons up.

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Here's why torque converter equipped machines do *more* work at *lower* operating cost

For higher work capacity on any given load, and for greater all-round daily production, more and more contractors are specifying torque converter drives in their new excavators, erecting cranes and loaders. And here are five good, profitable reasons why the torque converter is the preferred type of drive:

1. The torque converter eliminates lugging and stalling . . . permits engines to work at maximum efficiency delivering constant high-horsepower output for heavy digging loads and fast swinging.

2. *Smooth* converter power reduces peak loads throughout the machine's drive train because fluid within the converter absorbs much of the impact energy caused by quick drum speed change . . . thus protecting *both* driving and driven equipment.

3. When necessary, the torque converter smoothly delivers approximately twice normal torque to the drum, which, at slow digging speeds, represents an important advantage in power delivered to the dipper.

4. Cable life is extended since no sharp impact loads ever reach cables through the torque converter . . . constant line tension is maintained . . . there's no jerking or snapping.

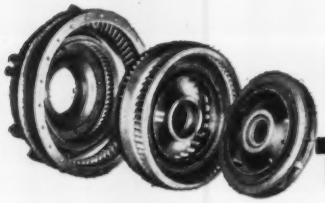
5. An infinite variety of ratios is available to work with . . . permitting smooth, accurate, *safe control* of loads and delicate "inching" and "holding" under power . . . as well as adjusting for wide variations in dipper loading, substituting greater digging effort for speed, when required.

Wherever earth and rock are moved, wherever steel is erected, you'll find contractors using these five advantages . . . *to convert their horsepower into greater-than-ever profits!*

• • •

Twin Disc Torque Converters—*three-stage* or *single-stage*, from 30 to 1000 hp—are available from all leading manufacturers of heavy-duty machines. Be sure to specify one in your next unit. Take advantage of the five reasons why torque converter equipped machines do *more* work at *lower* operating cost.

Twin Disc is the world's leading manufacturer of friction clutches and fluid couplings for heavy-duty industrial applications . . . and the only manufacturer producing *both* three-stage *and* single-stage torque converters. Because of its complete line of industrial drives, Twin Disc can offer *unbiased* recommendations for any heavy-duty power transmission application.



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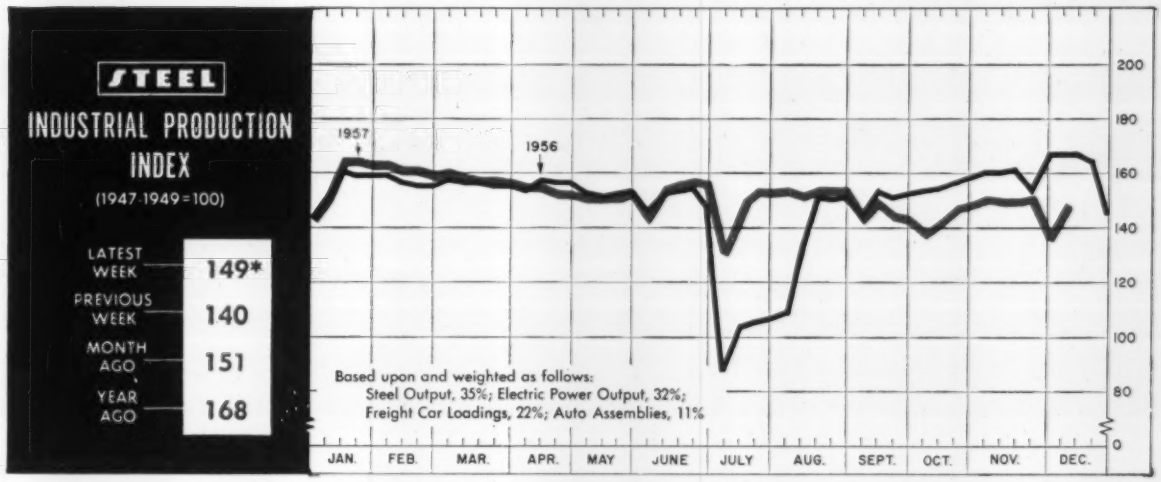

*Week ended Dec. 7.

Businessmen Optimistic Despite Downturn

MOST businessmen aren't letting the current decline get them down. The results of several recent surveys on expectations for 1958 show they have confidence in the short term outlook. They think sales, new orders, and profits are going to be as good next year as they are this year—perhaps a bit better.

Executives Speak—Dun & Bradstreet Inc., New York, polled 1627 executives in a broad selection of businesses and found that 59 per cent expect sales to increase next year. Thirty-two per cent think there will be no change. Manufacturers were slightly more optimistic than nonmanufacturers.

Profitwise, 37 per cent said things will be better in 1958 against 44 who thought earnings would level off. More than half (57 per cent) of the executives expect new orders to outpace 1957's. Only 9 per cent expect a decrease, and the remainder see more sidewise movement.

Half of those replying say they expect no change in the level of inventories, with the remainder split almost even for increases or decreases. Nearly three-fourths expect employment to remain unchanged during 1958.

D&B points out that the respondents were a good bit surer of the future of their companies than they were of the nation's economy. D&B also hints that the views expressed at the time of the survey may not be valid today because of "subsequent events."

Credit Men Agree—Almost the same percentage of respondents in a survey of credit managers agree that sales will improve next year. Henry H. Heimann, executive vice president of the National Association of Credit Men, says that 60 out of 100 members representing 25 industries expressed their confidence in improved business conditions in 1958. Another 20 believe the present level will prevail. The remaining 20, mostly in met-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,777[1]	1,831	2,522
Electric Power Distributed (million kw-hr)	12,200[1]	11,613	12,047
Bituminous Coal Output (1000 tons)	8,095[1]	9,320	10,869
Petroleum Production (daily avg—1000 bbl)	6,800[1]	6,829	7,353
Construction Volume (*ENR*—millions)	$201.0	$378.7	$323.3
Auto, Truck Output, U. S., Canada (*Ward's*)	170,954[1]	142,242	202,290
TRADE			
Freight Car Loadings (1000 cars)	620[1]	554	738
Business Failures (Dun & Bradstreet)	235	308	254
Currency in Circulation (millions)[3]	$31,666	$31,431	$31,450
Dept. Store Sales (changes from year ago)[3]	−20%	+4%	−1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$22,099	$23,600	$23,795
Federal Gross Debt (billions)	$274.8	$273.8	$276.6
Bond Volume, NYSE (millions)	$28.5	$20.7	$38.2
Stocks Sales, NYSE (thousands of shares)	11,077	12,316	11,989
Loans and Investments (billions)[4]	$86.1	$86.3	$86.2
U. S. Govt. Obligations Held (billions)[4]	$25.0	$24.9	$26.1
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	225.92
STEEL's Nonferrous Metal Price Index[6]	206.5	205.7	255.0
All Commodities[7]	117.8	117.8	116.0
Commodities Other Than Farm & Foods[7]	125.6	125.6	124.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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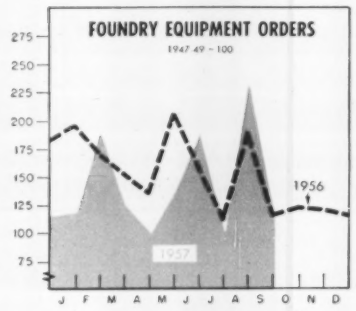
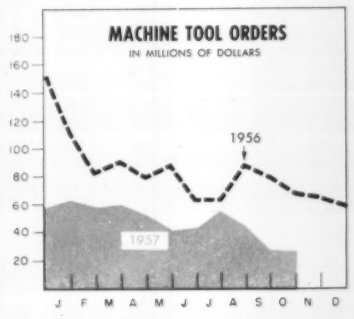
STEEL
Metalworking Weekly

THE BUSINESS TREND



	1957	1956	1955
Jan.	117.9	195.6	81.0
Feb.	188.4	169.0	90.4
Mar.	127.0	152.7	163.6
Apr.	101.1	135.2	178.6
May	136.2	207.0	145.7
June	187.5	156.7	186.8
July	98.6	110.3	213.4
Aug.	231.3	188.3	134.0
Sept.	113.9	114.7	156.7
Oct.	....	122.2	108.6
Nov.	....	121.0	154.4
Dec.	....	115.6	183.9
Avg	....	149.0	150.0

Foundry Equipment Mfrs. Assn.
Charts copyright, 1957, STEEL.



(Thousands of dollars)

	New Orders		Shipments	
	1957	1956	1957	1956
Jan.	63,250	109,550	76,550	54,600
Feb.	58,200	81,300	77,700	64,600
Mar.	58,900	89,500	89,100	74,150
Apr.	51,300	79,300	87,800	71,800
May	41,400	87,100	76,500	76,800
June	43,100	61,850	82,950	76,250
July	55,500	61,900	58,700	65,150
Aug.	44,500	87,500	63,200	75,100
Sept.	28,800	78,450	64,750	71,100
Oct.	27,850*	66,100	60,900*	89,750
Nov.	.....	64,250	.....	81,700
Dec.	.....	57,200	.....	85,150
Totals	.....	924,000	.....	886,150

*Preliminary.
National Machine Tool Builders' Assn.

alworking and public utilities, look for a downturn.

Seventy-five per cent of the respondents say profits next year will be equal to or better than this year's. But only 3 per cent feel their companies will increase dividends in 1958.

Managers Go Along — Preliminary results of STEEL's annual survey of plant managers (to be reported in detail in the Jan. 6 issue) tend to substantiate those findings. In view of the marked softness in many areas of metalworking, such optimism is surprising. But these men have never been wrong in the direction of their forecasting in the history of the survey.

GAMA Officer Sees Gain

Many appliance manufacturers feel that next year will see a rise in residential construction and repairs, with correspondingly good sales of their wares. Clifford V. Coons, executive vice president of Rheem Mfg. Co., New York, and president of the Gas Appliance Manufacturers Association, estimates that at least 15.6 per cent of the $32 billion outlay in housing will be spent on kitchen, laundry, and heating equipment. That would amount to a market worth about $5 billion. (The projected housing market consists of 1.1 million starts, valued at $17 billion, and repairs and improvements worth $15 billion.)

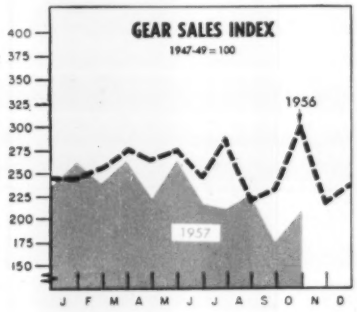
The GAMA official predicts that installations of gas dryers, incinerators, and year-round air conditioning systems will hit new highs next year.

Production Index Falters

A glance at STEEL's industrial production index injects a note of caution into such optimistic short term forecasts. The preliminary reading of 149 (1947-49 = 100) for the week ended Dec. 7 is a far cry from the record 168 posted in early December of last year. The only element in the composite which is still riding above year-ago levels is the output of electricity.

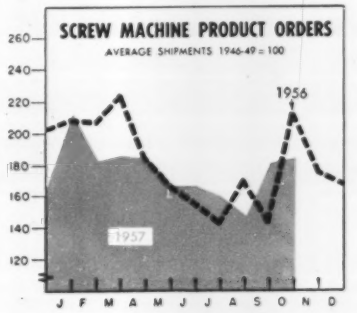
Steel production is running as much as 745,000 net tons a week behind last year's pace; auto assemblies are being cut back to keep more in line with discouraging sales; rail freight carloadings are more than 100,000 cars a week under the corresponding 1957 level.

Despite such relative weakness-



	1957	1956	1955
Jan.	259.3	245.5	140.9
Feb.	239.5	256.2	148.5
Mar.	262.4	276.5	172.8
Apr.	221.7	264.7	179.8
May	263.2	275.6	205.2
June	215.9	245.4	193.5
July	211.4	286.7	201.7
Aug.	225.8	219.5	217.6
Sept.	174.9	230.5	246.5
Oct.	207.0	299.8	227.6
Nov.	....	216.2	210.4
Dec.	....	235.7	245.5
Avg	....	254.4	198.3

American Gear Mfrs. Assn.



	New Orders 1957	New Orders 1956	Shipments 1957	Shipments 1956
Jan.	211	208	206	216
Feb.	181	207	185	214
Mar.	185	224	197	215
Apr.	183	184	193	199
May	167	165	192	178
June	166	154	173	178
July	159	142	139	137
Aug.	147	170	173	172
Sept.	181	143	168	164
Oct.	184	213	184	202
Nov.	...	175	...	180
Dec.	...	167	...	167
Avg	...	179	...	186

National Screw Machine Products Assn.

es, this will still be the third best December in the nation's history from an over-all viewpoint.

New Orders Slide Again

Sales of durable goods shrank in October for the third month in a row, reports the Department of Commerce. While the total of $13.9 billion (seasonally adjusted) was the lowest monthly figure so far in 1957, it is interesting to note that this was exceeded by only three months—October through December—in 1956.

Of more importance to future business prospects is the continuing decline in durable goods new orders to a 33-month low of $12.4 billion. If the optimism of the businessmen is to materialize, a pickup in new orders should make an appearance early in the first half of next year.

Employment Lacks Spark

Employment continues to show little spark for this time of year, although a purely seasonal uptrend may be noted as Christmas approaches. It will disappear after the holidays, with the possibility that cutbacks will be a little more than seasonal, according to the bimonthly area labor report of the Department of Labor.

The report shows that three-fifths of the 149 major areas surveyed experienced small to moderate unemployment increases during the fall. The most significant layoffs centered in the aircraft industry.

Factory employment in the four-county Pittsburgh area decreased about 4400 during October, mostly because of production losses in primary metal plants.

In marked contrast is the announcement from International Harvester Co., Chicago, that employment in its manufacturing and raw material operations increased more than 1000 in November. The company expects the trend to continue through December.

Bellwether Industry Up

Shipments and new orders of screw machine products moved upward in the fall (see table above), reports the National Screw Machine Products Association. Through October, the monthly average for orders was 176 compared with 179 for all of 1957. Shipments averaged 181 against 186 in 1956.

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pushes safety records up—pulls chain costs down!

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REGISTERED! You get a certificate of test with every TM Alloy Chain. It bears the chain's guarantee . . . proof test . . . serial number.

Alleviate the squeeze on profits and tighten your grip on safety—switch to TM Alloy Steel Chain. Gamma Ray Quality Control . . . Controlled Atmosphere Heat-Treating . . . patented Tayco Hooks make it *Triple-Safe!* Never requires annealing! Tough—withstands abrasion, shock, grain-growth and work-hardness. Get *all* the facts!

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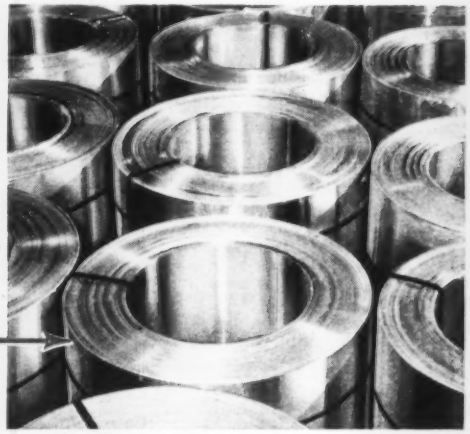

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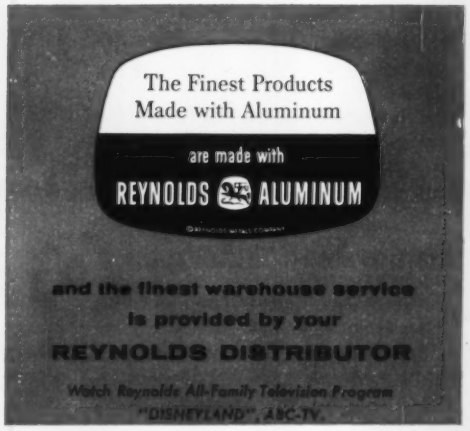

PAUL H. SETZLER
Babcock & Wilcox v. p.

J. R. BAREFOOT
Federal Machine president

EUGENE P. CUNNINGHAM
Clearing Machine v. p.

WALTER W. GOEHRING
Stokes manager-mfg.

Paul H. Setzler was elected a vice president of **Babcock & Wilcox Co.**, in charge of the manufacturing department at the boiler division, Barberton, Ohio. **William J. Thomas,** vice president - general manager, tubular products division, Beaver Falls, Pa., was placed in full charge of the division following resignation of **Edward A. Livingstone. Robert P. Stuntz** was made assistant sales manager, refractories division, New York.

J. R. Barefoot was elected president, **Federal Machine & Welder Co.**, Warren, Ohio. He succeeds **A. S. Blagden,** who fills the new post of chairman, continuing as chief executive officer. Mr. Barefoot was made vice president in 1952.

Zeke R. Smith, chief engineer, was elected vice president, **Potter & Brumfield Inc.**, Princeton, Ind., and named director of engineering.

Sharon Steel Corp., Sharon, Pa., promoted **Henry G. Evans** to general manager of operations. He was general works manager, Roemer Works, Farrell, Pa., and is succeeded by **William A. Horning. A. G. Neese,** manager of stainless and alloy sales, and **Charles W. Diven Jr.**, Philadelphia district sales manager, were promoted to assistant general sales managers for the corporation.

Norman E. Bourne was made assistant to general superintendent, South Works, **U. S. Steel Corp.**, Chicago.

Eugene P. Cunningham was elected vice president-sales and administration for **Clearing Machine Corp.**, Chicago, division of U. S. Industries Inc. He was vice president-sales. He now assumes additional administrative duties in Clearing's diversification program.

L. W. Darling was made general sales manager, **Davey Compressor Co.**, Kent, Ohio. He retains the post of assistant vice president.

Charles J. Petry was made assistant to the chairman of **Acme Steel Co.**, Chicago. He will co-ordinate and expedite construction of new steelmaking facilities. He was division superintendent at the Worcester, Mass., plant of American Steel & Wire Div., U. S. Steel Corp.

Rudolph F. Hanson was named assistant to the director of sales, material handling equipment, **Ingersoll Kalamazoo Div.**, Kalamazoo, Mich., Borg-Warner Corp.

Howard E. Ewell was named general superintendent of foundry, machine shop, and plant maintenance operations at **Worthington Corp.'s** compressor and engine division, Buffalo.

James R. Strother was made assistant sales manager, industrial hose products, **Flexonics Corp.**, Maywood, Ill.

Harvey O. Oberg was made hydraulics division manager, **Wyle Laboratories,** El Segundo, Calif. He was with North American Aviation Inc.

Walter W. Goehring was appointed manager of the manufacturing department, **F. J. Stokes Corp.**, Philadelphia. He was manufacturing manager, can division, Crown Cork & Seal Co. Inc. Before that, he was general factory manager, SKF Industries Inc.

Louis W. Falk was elected executive vice president, **Falk Corp.**, Milwaukee, to succeed his brother, **Harold F. Falk,** recently elected president. Louis Falk was vice president-manufacturing.

Tad Stanwick was elected a vice president of **Cleveland Pneumatic Tool Co.**, Cleveland. He was formerly vice president of American Machine & Foundry Co.

August Gorske Jr. was appointed sales manager, **Great Lakes Screw Corp.**, Chicago.

Joseph DeSanto was made manager of welding sales, Chicago section, **Champion Rivet Co.**

Charles J. Lause Jr. was made director of commercial research, **Jones & Laughlin Steel Corp.**, Pittsburgh.

Carborundum Co., Niagara Falls, N. Y., integrated into a refractories division its Stupakoff Div. at Latrobe, Pa.; Globar Div., Niagara Falls; and refractories division, Perth Amboy, N. J. **Boyd M. Johnson,** vice president, was named general manager of the new refractories division. **Robert A. Barr** was made assistant general manager-sales; **A. L. Leo-Wolf,** as-

WILLIAM J. McGRAW

WALTER G. MITCHELL

newly created posts at Thor Power Tool

LEONARD V. KLAYBOR

PAUL R. BORNEMAN

Allegheny Ludlum appointments

sistant general manager-operations.

Thor Power Tool Co., Chicago, appointed **William J. McGraw** general sales manager, with headquarters in the Aurora, Ill., Works administration building; **Walter G. Mitchell**, general manager of product development, with headquarters in the Prudential Plaza office in Chicago; **Milton E. Slater**, sales manager, farm and ranch division, Marengo, Ill.

William B. Russell, carbon plant superintendent at the Massena, N. Y., operations of **Aluminum Co. of America**, was made production manager of the smelting works. He succeeds **E. T. Wagar**, recently named smelting works manager.

Paul Zoffman was appointed technical director, **Sam Tour & Co. Inc.**, and its affiliate, **American Standards Testing Bureau Inc.**, New York.

At **Chrysler Corp.'s** stamping division, Detroit, **William G. Martin** was named divisional industrial engineer; **Charles C. Mezey**, plant manager of the Nine Mile press plant.

William H. Mutschler was made chief engineer, Pittsburgh Works, **Allis-Chalmers Mfg. Co.**, to succeed **W. M. Terry Jr.**, recently named director of engineering coordination, industries group. **C. R. Burnett** succeeds **E. H. Baxa** as engineer in charge of pyro-processing machinery.

Edward W. Haskell was made district manager for the west central region, **Lamson Mobilift Corp.** He is at Chicago.

Leonard V. Klaybor was made product manager, tool steel sales, **Allegheny Ludlum Steel Corp.**, Pittsburgh. He was chief research metallurgist, tool and die steels, at the Dunkirk, N. Y., Works. **Paul R. Borneman**, former supervising research metallurgist, succeeds him.

Alfred Augustine was named director of engineering; **Edward A. Siemon**, chief engineer; **C. R. Wilt Jr.**, assistant chief engineer of **Loftus Engineering Corp.**, Pittsburgh.

P. M. Christensen fills the new post of co-ordinator of engineering, **Federal Pacific Electric Co.**, Newark, N. J.

Walter A. Nikazy was elected general manager, **Haughton Elevator Co.**, Toledo, Ohio, and a vice president of the parent company, **Toledo Scale Corp. John A. Brubaker**, president of Haughton, has retired.

Raymond LaFrance was named vice president and treasurer, **General Sheet Steel Co.**, Cleveland. He was vice president-manufacturing at S. K. Wellman Co.

C. W. Hanna was made Chicago regional manager, industrial division, **Gould - National Batteries Inc.**, Trenton, N. J.

Youngstown Sheet & Tube Co., Youngstown, appointed new assistant general superintendents. They are: **Robert H. Frushour**, steel plant and Struthers Works; **Jack**

J. E. WORKMAN

HOWARD M. GIVENS

W. G. DAHL

executive promotions at Latrobe Steel

J. E. Workman was elected executive vice president, **Latrobe Steel Co.**, Latrobe, Pa. **Howard M. Givens** was named vice president-sales; **W. G. Dahl**, general sales manager. Mr. Workman, former vice president-sales, fills a newly created post. Mr. Givens was southern regional manager in Miami, Fla. Mr. Dahl was eastern regional sales manager, Hartford, Conn.

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You Can Use
Standard Multi-Spindle Natcos

Any time your parts require machining *more than one hole*–drill, bore, face or tap–it may well be a "Natco Natural." Your standard Natco will produce substantial savings in a surprising number of situations, *even in small job-shop lots!* Call in your nearby Natco field engineer; he'll tell you in short order whether you've got a "Natco Natural" there.

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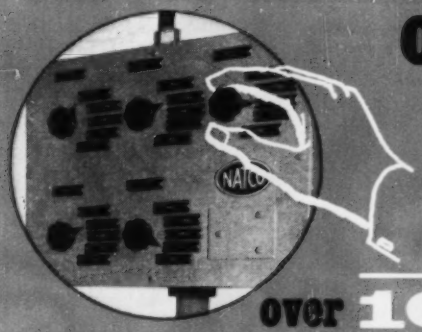
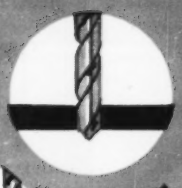
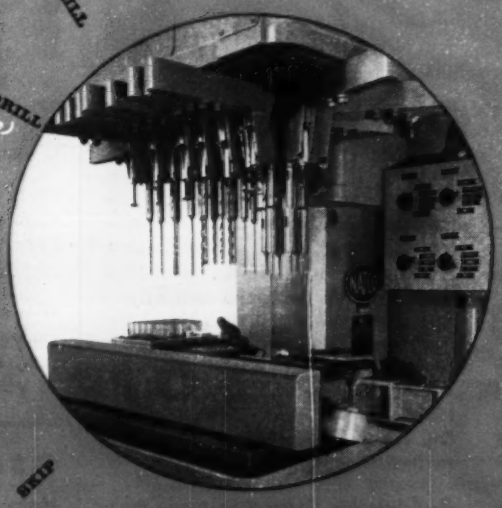


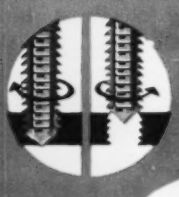
5 cycles
5 positions
over 100 combinations

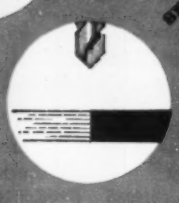

DRILL

STEP DRILL (deep hole)



CHAMFER (short feed)


TAP


SKIP

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Select either of

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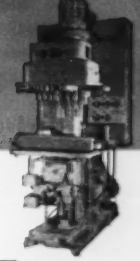

Standard multi-spindle Natcos range from 1 hp, 10-spindle machines to 50 hp machines with up to 72 spindles. Spindles in standard Natcos are driven through universal joints and located by either adjustable arms of bored slip plates.

NATCO

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Multi-spindle drilling, boring, facing & tapping machines. Special machines for automatic production.

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JOSEPH F. DEGEN
Weston v. p.-mfg.

EDWARD H. FISHER
Tube Reducing president

JOHN C. BIGHAM JR.
Universal-Cyclops post

ROBERT C. CARSON
Federal-Mogal purchasing dir.

ARTHUR R. COLLINS
Stewart-Warner v.p.

M. W. HARTMAN
Darling Valve div. post

F. Major, flat rolled and tubular products; **James W. Kirkpatrick,** Brier Hill Works.

Robert C. Carson was promoted to director of purchases, **Federal-Mogul Div.,** Federal-Mogul-Bower Bearings Inc., Detroit. Formerly assistant purchasing director, he succeeds **E. F. Bauman,** recently made director of purchasing staff activities for the corporation.

Arthur R. Collins, since 1948 general manager of **Stewart-Warner Corp.'s** South Wind Div., Indianapolis, was elected a vice president of the corporation. He continues as general manager of the South Wind Div.

Downingtown Iron Works Inc. named **Donald F. Baumler** manager of its new Buffalo district sales office.

Broderick & Bascom Rope Co., St. Louis, elected **J. J. Sieber** vice president-sales. He is succeeded as sales manager by **K. B. Britt.**

M. W. Hartman was named sales manager, Darcova Div., **Darling Valve & Mfg. Co.,** Williamsport, Pa., a new post. He was a district sales engineer with the company in the midwest area.

Lewis H. Warheit was made works manager, Butler, Pa., freight car plant, **Pullman-Standard Car Mfg. Co.** He succeeds **Harry S. Hagan,** retired.

C. Frederick Crow was made manager of the Bristol, Conn., plant, **New Departure Div.,** General Motors Corp. He succeeds **Robert H. Wilkie,** now on special assignments.

Charles S. Tennant was named manager of **Ford Motor Co.'s** Cleveland engine plant No. 1. He replaces **H. D. Rowe,** resigned. **Clinton D. York** succeeds Mr. Tennant as manager of the Lima, Ohio, engine plant.

John J. Bricker was elected vice president of **International Business Machines Corp.,** New York.

Weston Electrical Instrument Corp., Newark, N. J., subsidiary of Daystrom Inc., appointed **Joseph F. Degen** to its executive group as vice president-manufacturing. He was manufacturing superintendent at the Poughkeepsie, N. Y., plant, International Business Machines Corp.

Edward H. Fisher was elected president, **Tube Reducing Corp.,** Wallington, N. J. He had been with Oliver Corp. as vice president and manager of its special products division, and previously was executive vice president of A. B. Farquhar Co. before it was acquired by Oliver in 1952.

John C. Bigham Jr. was made manager of stainless strip sales, **Universal-Cyclops Steel Corp.,** Bridgeville, Pa. He was manager-stainless steel sales at Superior Steel Corp.

G. J. Landstrom, financial vice president - treasurer, **Sundstrand Machine Tool Co.,** Rockford, Ill., was elected financial vice president-secretary, assuming the secretarial post held by his late brother, **Edgar Landstrom. James W. Ethington,** assistant treasurer-controller, is now treasurer-controller.

John A. Bader was named district manager-sales for **Republic Steel Corp.'s** culvert division at Hammond, Ind.

William F. Gates, director of purchases, **Black, Sivalls & Bryson Inc.,** Kansas City, Mo., was elected purchasing vice president.

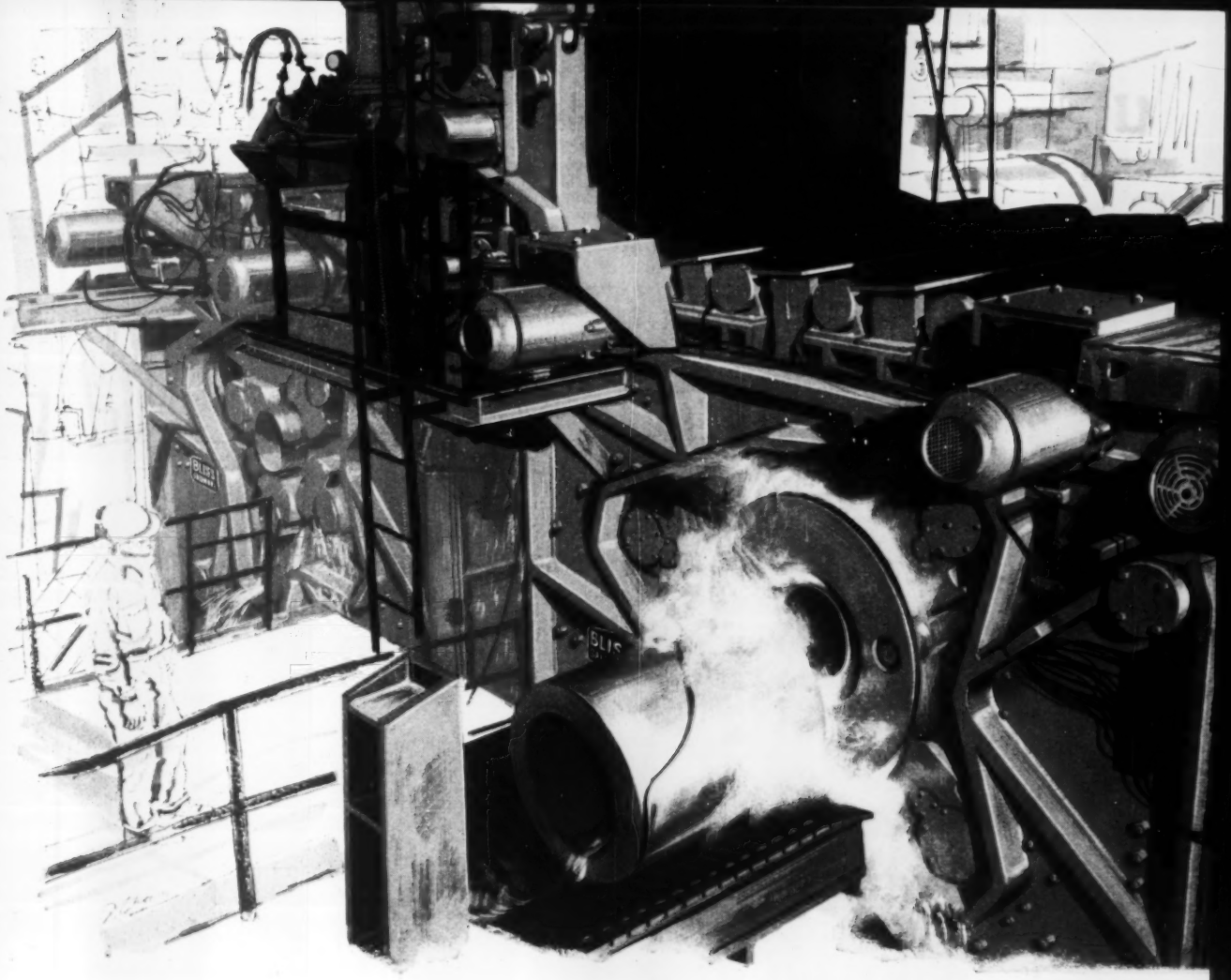
OBITUARIES...

Harold C. Lee, 56, a purchasing agent in **General Electric Co.'s** foundry division, Erie, Pa., died Nov. 27.

Charles H. Hays Jr., 57, president and general manager, **Eureka Electrical Products Co.,** North East, Pa., died Nov. 27 in Florida.

Ralph E. MacDonald, retired manager, Pittsburgh sales office, **North American Refractories Co.,** died Nov. 24.

Percy H. Freedman, 57, president and treasurer, **Commercial Metals Co. Inc.,** Buffalo, died Dec. 2.



J & L finds a thrifty way to equip a mill with new downcoilers

Not long ago, the 96" hot strip mill at Jones & Laughlin's Pittsburgh Works began to show need for coiler improvements. Bliss Rolling Mill engineers were called in to see what could be done.

After analyzing the situation, they determined that parts of the existing coilers could be retained for use with the Bliss Downcoiler principle. Bliss then performed the task of special design and "field tailoring" to insure improved functional operation.

Today, J & L has the equivalent of a pair of brand new downcoilers, complete with new housings, blocker rolls, stripper mechanisms, roller tables, guides and pinch roll units. The new coilers can handle 30,000-pound coils up to 94" wide.

This particular installation is typical of the Bliss Rolling Mill Division's versatility and open-minded approach to a customer's problem. It's easy to learn more about what they have done and can do... just write us today for a free copy of our 84-page Rolling Mill Brochure, Bulletin 40-B.

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E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

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ANY TYPE OR SIZE YOU NEED

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SPROCKETS, iron and steel, for single ROLLER CHAIN

1.92" to 26.74" P.D.
SPROCKETS, iron and steel, for double ROLLER CHAIN

¼" to 2½" P. **ROLLER CHAIN** single, double, and triple

1.94" to 12.74" P.D.
SPROCKETS, iron and steel, for BLOCK CHAIN

⅛" to ½" w. **BLOCK CHAIN**

.37" to 6.07" P.D.
SPROCKETS, bronze and steel, for LADDER CHAIN

.185" to .353" P. **LADDER CHAIN** brass and steel

Save machining time

SHOLD-A-GRIP
interchangeable tapered
SPROCKETS and BUSHINGS
2.09" to 23.88" P.D. SPROCKETS adaptable with tapered BUSHINGS to shaft sizes ½" to 3" by 16ths

BORED-TO-SIZE
ready-to-install
SPROCKET PINIONS
Complete with keyway and setscrew. ⅜" through 1" P., in 76 tooth sizes, with 321 stock bores

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Stock Gears • Sprockets and Chain • Speed Reducers • Bearings • Pillow Blocks • Couplings

To Study Castings

Chance Vought gets Air Force contract to develop castings for future supersonic planes

RESEARCH is being intensified to develop processes of casting high strength steels in the complex shapes required by the aircraft industry and capable of withstanding extremely high temperatures.

Chance Vought Aircraft Inc., Dallas, has been awarded a $1,093,854 Air Force contract to do this work. Most of the steel castings in today's supersonic aircraft are used at temperatures of about 275° F. With the projected increase in speeds of tomorrow's planes into ranges from 1500 mph to 2300 mph, metals used in them must withstand temperatures up to 1000° F.

Contract Provisions — John K. Dietz, Vought structures materials engineer, will be project engineer for the contract. It covers five phases:

1. To select three foundries to do development work on aircraft parts designed by Vought.

2. To select, through laboratory tests, steel alloys capable of being stressed to 180,000-220,000 psi and work out ways to make them castable. One of the final goals will be to produce usable castings capable of developing tensile strength from 260,000 to 300,000 psi.

3. To design parts to be cast for Vought. Changes in design may be called for after preliminary castings are made.

4. Trial production of a contoured part in larger lots to see if it is producible in quantity.

5. To pilot production of selected castings in quantities sufficient to establish consistent results.

Development data obtained will be made available to all foundries making castings for military aircraft.

Manufactured parts made by casting, where they can be substituted for parts made by other methods, will effect considerable dollar savings for aircraft companies. A comparable part produced by casting may cost as little as one-tenth as much as the part fabricated by more time-consuming methods, says the Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio.

Opens Jobbing Foundry

Pennsylvania Malleable Iron Corp. is operating its new malleable iron foundry in Landisville, Pa. The plant duplicates facilities of the firm's main plant in Lancaster, Pa. A third plant, the company's Hardware Div. in Lancaster, has been in operation for a number of years. Operations at the new plant are directed by T. M. Blank, vice president and manager of manufacturing. C. P. Speitel Jr., assistant secretary of the corporation, is assistant plant manager; Ralph E. Getz is plant manager.

Chase Brass Sells Unit

Chase Brass & Copper Co., Waterbury, Conn., sold the Cold Heading Dept. of the Waterbury Mfg. Co. Div. to Connecticut Screw & Rivet Co., Waterbury, and its affiliate company, Anchor Fastener Inc.

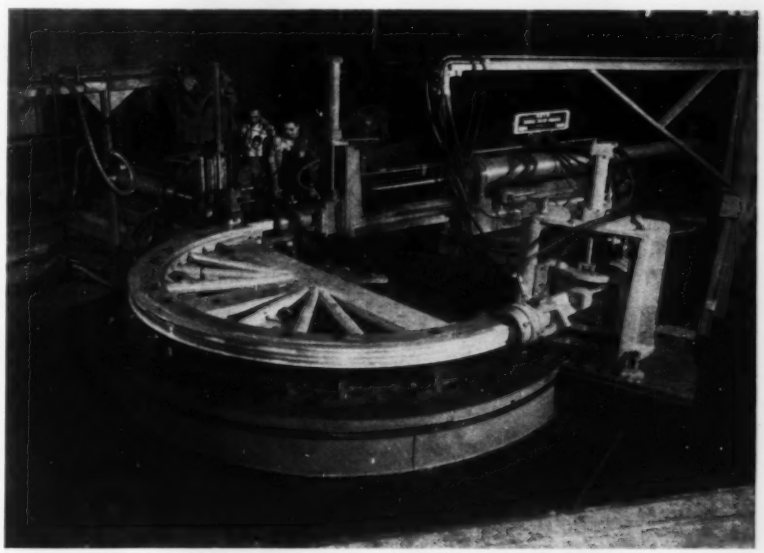
Adds Metallurgical Lab

Wallingford Steel Co., Wallingford, Conn., has added a metallurgical laboratory to its quality control facilities. The laboratory contains a library, conference room, and these sections: Metallographic, analytical, and special testing. The firm also announced the purchase of a second Sendzimir mill and additional bright anneal equipment.

Aetna Steel Expands

Production capacity of the Pottsville, Pa., plant of Aetna Steel Products Corp.'s Door & Door Frame Div. has been increased by 30 per cent. The Hollow Metal Div. gained 250,000 sq ft of space when the manufacture of movable partitions was moved to a new addition. Plant capacity was also bolstered by the installation of new multiple punch presses, shears, power brakes, and additional automation. Production lines have been rearranged and material handling procedures speeded up by

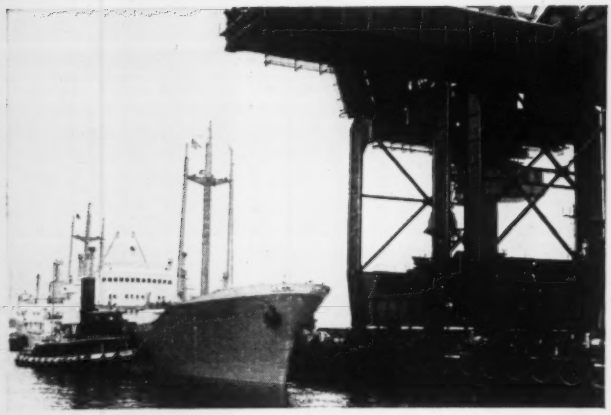
(*Please turn to Page* 90)



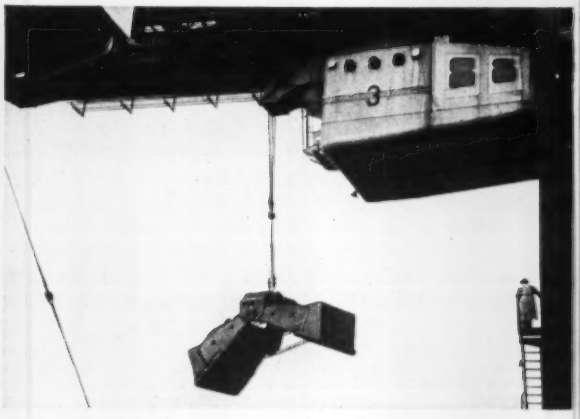
$515,000 Convair Machine Produces Mighty Stretch

This radial draw former has been installed at the San Diego, Calif., plant of Convair Div., General Dynamics Corp. The machine turns out large structural parts for Convair 880 jet transports. Built by Cyril Bath Co., Solon, Ohio, it has a 150-in. diameter rotary worktable, a 75-ton capacity tension ram, and a 35-ton compression ram. It weighs 87 tons, is 75 ft long, 30 ft wide, and 12 ft high. It is shown stretching into shape a heavy H-beam to produce a fuselage belt frame used at points where the aircraft's wing attaches. The machine makes possible design of such parts with fewer components. This produces more strength for less weight in the airplane

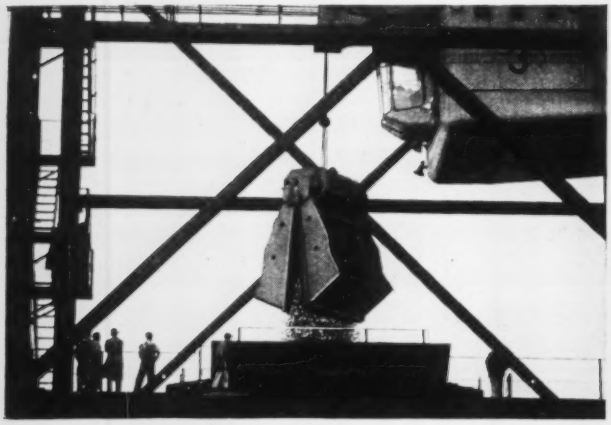
Faster than a



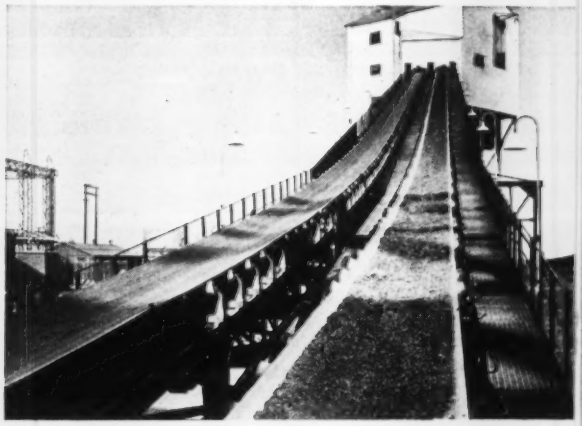
Unloaders handle vessels on both sides of finger-type pier.



Each unloader can take out 18 tons of ore every 45 seconds.



Each unloader has movable hopper to transfer ore to belt conveyers or direct to railroad cars on pier.

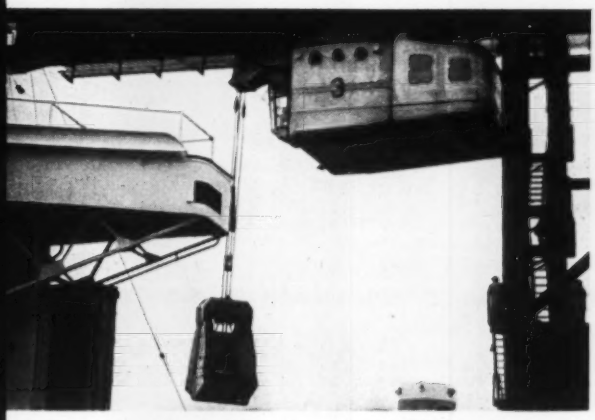


Twin belt conveyers, 48" wide and 1080 feet long move ore at 600 feet a minute to a carloading house.

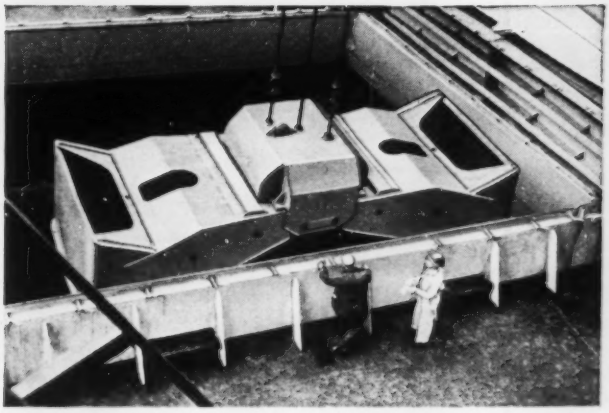
Electronic weighing, accurate to the pound, is recorded on printed cards.

After exact weighing, ore is loaded into thoroughly flushed out cars.

ton a second



Unloaders are "slewing jib" type. 190-ton gondola moves back and forth on trolley and rotates in full circle.



For greater efficiency, light weight buckets use mechanical principle to dig ore on a plane instead of "trenching" back and forth, and clean out holds without auxiliary equipment aboard ship.

Chesapeake and Ohio's new bulk cargo unloading facility at Newport News on Hampton Roads, Virginia, is now giving ore importers and ship operators the finest service on the Atlantic coast. Its 1191-foot pier accommodates the largest ore carriers afloat. Three mobile unloaders, operating with unprecedented flexibility and speed, work two ships simultaneously or three holds of a single large ship and handle two types of ore at the same time. Various sizes of buckets, changeable in less than five minutes, are available for different types of ore and vessel. In a matter of minutes, ore carried on twin belt conveyors is loaded, after electronic weighing, into open top cars for swift Chesapeake and Ohio rail movement inland.

Ship operators like the quick access to the new C&O pier at Newport News and the faster turn-around. Ore importers like C&O's ready car supply and prompt delivery of their cargoes.

* * *

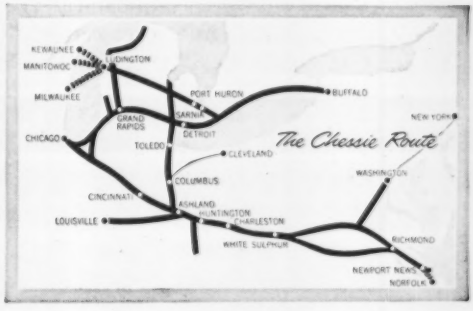
Chesapeake and Ohio's World Commerce Department assists exporters, importers, forwarding agents, steamship operators on all matters relating to rail and ocean shipping of import ores and other overseas and intercoastal cargoes.

Write for illustrated folder showing in detail the operation and advantages of C&O's new bulk cargo unloading facility.

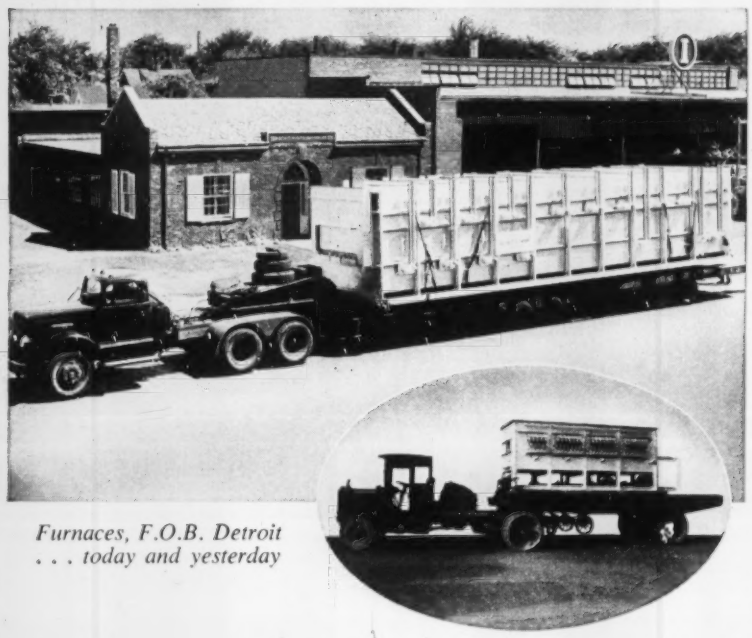
Chesapeake and Ohio Railway

WORLD COMMERCE DEPARTMENT, NEWPORT NEWS, VA.

World Commerce Dept. Offices: New York 7, N. Y., 233 Broadway • Chicago 4, Ill., 327 LaSalle Bldg. • Detroit 26, Mich., 525 Lafayette Bldg. • Richmond 10, Va., 823 East Main St. • Stockholm, Sweden, Kungsgatan 7



HOLCROFT • BLAZING THE HEAT TREAT TRAIL FOR OVER 40 YEARS



Furnaces, F.O.B. Detroit . . . today and yesterday

HOLCROFT "delivers the goods"

Back in '27, Holcroft, even then a company with many years of experience to its credit, custom-designed, built and delivered the electric, non-metallic heated walking beam furnace shown in the oval above . . . and at that time it was the most advanced, efficient furnace of its type then on the market.

Today, Holcroft is still "delivering the goods" . . . in the instance illustrated, a radiant-tube heated pusher type gas-carburizing furnace for automotive transmission parts. In the transition from the old to the new, it is worthy of note that Holcroft contributed substantially to the application of radiant-tube heating to continuous furnaces and pioneered in the development of gas carburizing. The basic principle, in fact, on which *all* modern gas- carburizing furnaces operate was disclosed by Holcroft engineers in 1935.

The same pioneering spirit is a guiding principle at Holcroft today. And when this "spirit" is combined with the experience, the research, engineering and manufacturing facilities that Holcroft offers, you can readily see why it pays to let Holcroft handle all phases of your heat treat furnace projects. May we be of assistance to you?

HOLCROFT AND COMPANY

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PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

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CANADA: Walker Metal Products, Ltd., Windsor, Ontario

(*Concluded from Page* 87)

new conveyor systems and the revamping of lines.

Howard Buys Motor Line

Howard Industries Inc., Racine, Wis., purchased Westinghouse Electric Corp.'s Universal Motor Div., Lima, Ohio. The purchase includes all assets of the division except the land and building. Howard is moving all machinery and equipment from Lima to its plant in Racine for installation in a recently completed 35,000 sq-ft addition.

Lets $2-Million Contract

Standard Oil Co. of California, San Francisco, awarded a $2-million-plus contract to the Fluor Corp. Ltd., Los Angeles, to design, engineer, and construct a 275,000 lb-per-hour steam generating plant and attendant facilities at its El Segundo, Calif., refinery. Construction is scheduled to begin August, 1958, with completion set for March, 1959.

To Build Lithium Refinery

Quebec Lithium Corp., Montreal, Que., plans to build a $3-million refining plant at Rouses Point, N. Y. Lithium will be shipped to the plant from the corporation's mine at Val d'Or in northwestern Quebec. The plant is scheduled to be in full operation by 1959.

Diamonite Installs Kiln

Diamonite Products Mfg. Co., division of United States Ceramic Tile Co., Canton, Ohio, has placed in operation another continuous tunnel kiln at its Shreve, Ohio, plant. The kiln increases Diamonite's monthly production of high alumina ceramics by several million units.

USI Merges Two Divisions

U. S. Industries Inc., New York, has merged its Chicago Steel Tank Co. with another USI division, Solar Permanent Co., for administrative purposes. The divisions now are under the direct supervision of A. Sternberg, general manager of Solar, who will direct

Is the Wean "Flying Press"

the fastest press in the world?

WE THINK IT IS. While our top speeds have stayed around 600 strokes per minute on the "flying press," the size of piece is not restricted to washers and the like which are made on other high speed presses.

For example, where conventional presses rarely can process more than 100 feet of metal per minute, the "flying press" has performed at speeds in excess of 300 feet per minute.

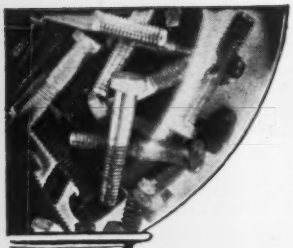
One new model, for instance, blanks automotive assemblies 8 feet long at 45 per minute.

Yet, the "flying press" has other major advantages for you. Despite its revolutionary construction, it requires up to 20% less maintenance than other presses — it has no brake or clutch to wear. And, because of almost perfect dynamic balance, the press can be floor mounted.

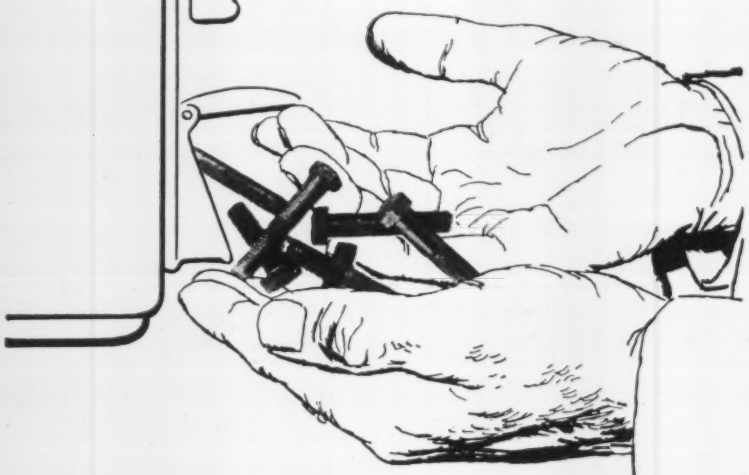
We could write a book about the features of the Wean "flying press" — in fact we have. It's soon to be released . . . and it's yours for the asking. Write to the address below. We will mail your copy of the Wean "Flying Press" brochure as soon as it comes from the printers.

Wean Equipment Corporation

CLEVELAND 17, OHIO



...the perfect way
NOT
to buy fasteners!



When you purchase FASTENERS, your first considerations should be given to quality, delivery and prices.

Chandler, as a leading manufacturer of cold forged cap screws, takes the same considerations. Mass production is only part of their story . . . but absolute control during every phase of production means top quality and uniformity.

Realistic pricing is important . . . and is followed.

If your requirements include automotive, Place self-locking, connecting rod or aircraft engine bolts in high carbon alloy and stainless steels, check with Chandler today. They are prepared to produce special heads, drilled heads and shanks, and ground bolts to tolerances as close as 0.0005-inch.

Write today for literature.

Specialists in Thread-Rolling after Heat Treating.

CHANDLER PRODUCTS CORPORATION

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6473-CH

both activities from offices in Chicago and Tomahawk, Wis. Chicago Steel Tank makes a line of alloy steel and carbon steel storage tanks, specially engineered pressure vessels, and process equipment. Solar Permanent's principal product is a stainless tank for storage of milk; it also makes other types of stainless steel products.

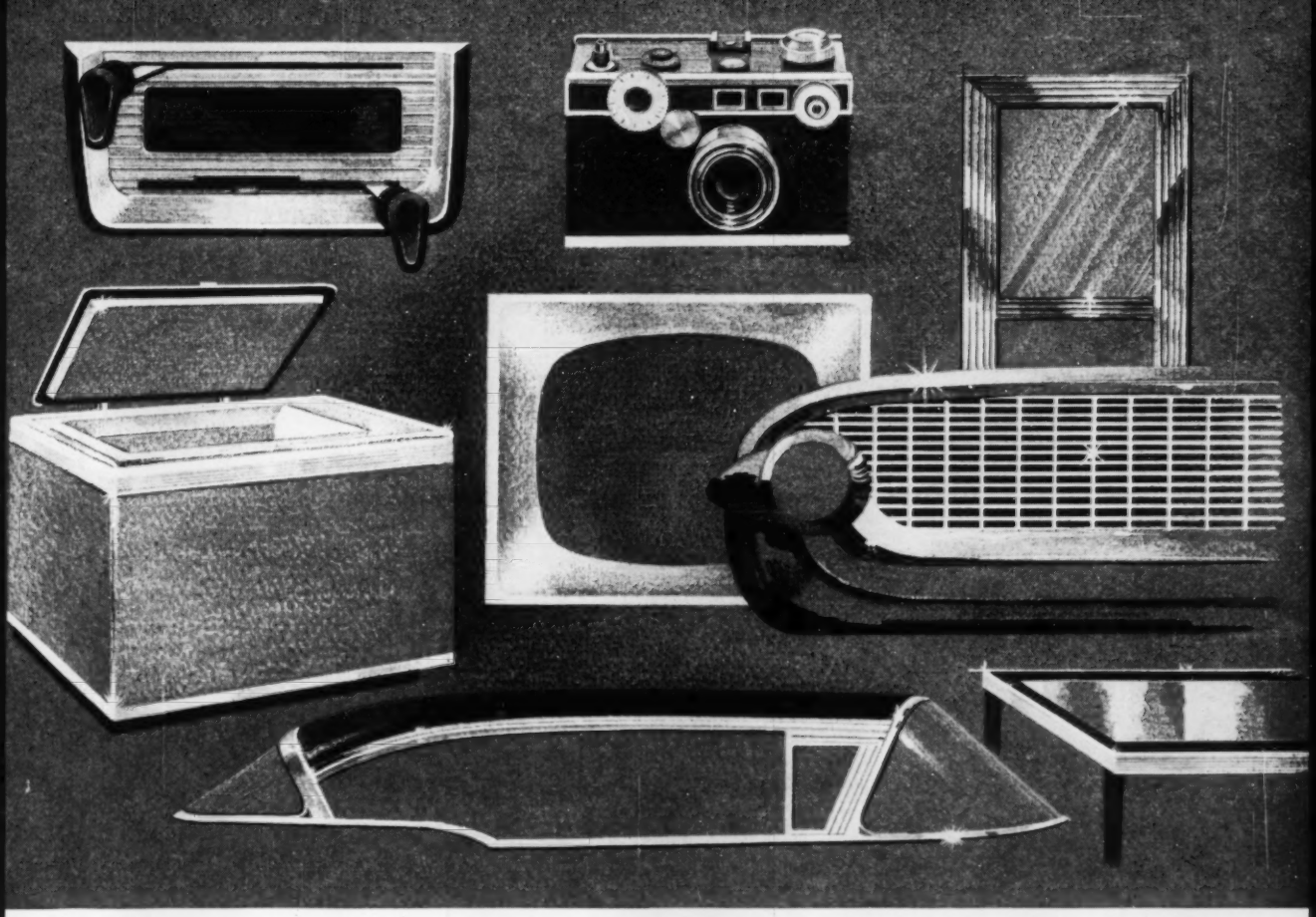
CONSOLIDATIONS

United Drill & Tool Corp., Chicago, plans to merge with **Greenfield Tap & Die Corp.**, Greenfield, Mass. If approved by stockholders, the consolidated organization would operate under the name of United-Greenfield Corp. Products of United divisions (Chicago-Latrobe, Whitman & Barnes, and Unimet Carbides) and its subsidiary (J. H. Williams & Co.) consist of twist drills, reamers, carbide metal and carbide tools, wrenches, and commercial drop forgings. Greenfield is principally a manufacturer of taps, dies, gages, and chasers; it also produces drills, reamers, end mills, and certain types of chucks.

Officers of United-Greenfield would include: Chairman, Michael J. Kearins; chairman of the executive committee, D. G. Millar; president, Konstantin Kronwall.

Industrial Enterprises Inc., New York, purchased **Philadelphia Chain Block & Mfg. Co.**, Philadelphia, producer of hoists and other special material handling equipment. These products will complement those of Industrial Enterprises' Crane Div. at Milwaukee.

Franklin Research Corp., Boston, acquired **Fullerton Mfg. Corp.**, Norwalk, Conn., manufacturer of commercial fluorescent lighting equipment. Fullerton is the sixth member of the group making up the Franklin Research Corp. Others are: Wheeler Reflector Co. (incandescent, street lighting, and fluorescent fixtures), Boston; Brown Bag Filling Machine Co., (packaging), Fitchburg, Mass.; Frank Industries (electronics producer), Worcester, Mass.; Paul Whitin Mfg. Co. (synthetic textiles), Gilbertville, Mass.; and



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Bohn's expanded facilities now offer to all industry:

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- Complete facilities for plain and color anodizing, decorative painting, silk screening, buffing, etching, chemical brightening, fabricating!
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- Design assistance by Engineers and Metallurgists with years of fabricating and anodizing experience!

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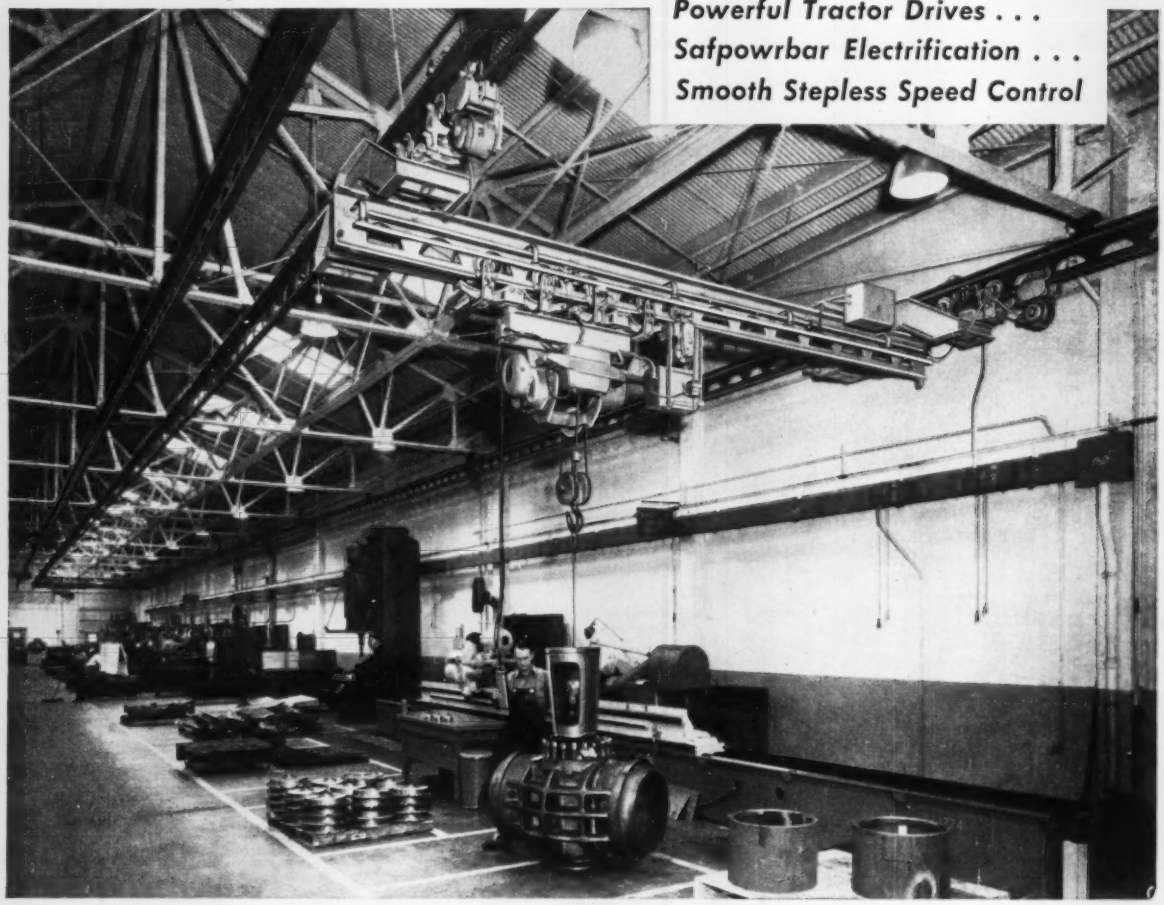
A *Mighty Fine* 5 TON CRANE

Powerful Tractor Drives . . .
Safpowrbar Electrification . . .
Smooth Stepless Speed Control



HERE IS a modern 5 ton crane that offers you the finest in performance. Completely motorized, this 22'-0" long heavy-duty crane is floor-operated with all motions controlled by the pendant push-button station.

Rugged four-wheel tractor units propel both the bridge and the carrier; two units on the bridge and one on the carrier. The tractors not only have tremendous draw-bar pull for their size, but are easy to inspect and maintain. If ever necessary, a tractor can be quickly uncoupled and replaced by a spare.

Reactor type single-speed control provides unusually smooth acceleration for bridge and carrier drives which have travel speeds of 125 fpm.

Safety-conscious people will find Cleveland Tramrail Safpowrbar electrification on the crane and runway of tremendous advantage. It protects against serious injuries from accidental contact, and of additional interest, the sliding collector shoes have approximately five times the life of collector wheels.

This crane is only one of dozens of types and sizes Cleveland Tramrail has available. So whatever your needs, you can be sure that Cleveland Tramrail is in a position to serve you.

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THE CLEVELAND CRANE & ENGINEERING CO.
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CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Standard Machinery Co. (plastics machinery), Mystic, Conn.

Ex-Cell-O Corp., Detroit, purchased **Roto-Mation Inc.**, Greenville, Ohio, a subsidiary of Pines Engineering Co. Inc., Aurora, Ill. Roto-Mation products (rotary, oscillating, torque actuators) are still being made in Greenville.

NEW OFFICES

Firth Sterling Inc., Pittsburgh, opened a branch office and warehouse at 1824 Huntsville Rd., Birmingham, Ala. The distribution center will stock high speed tools and dies, lathe bits, precision flat ground steel, drill rods, carbide cutting tools, high temperature alloys, stainless steels, and zirconium.

Scovill Mfg. Co., Waterbury, Conn., moved its Cleveland-Pittsburgh regional sales office and warehouse to 4635 W. 160th St., Cleveland, Ohio. Calvin W. Seeley is the regional sales manager. Brass and aluminum mill products will be stocked in the 20,000 sq-ft warehouse.

NEW PLANTS

A & M Tool & Die Co. purchased the former Ames Worsted plant at Southbridge, Mass. About one-third of the building's 225,000 sq ft will be used immediately by the firm, with the balance to be leased to other manufacturers.

American Bosch Arma Corp., Hempstead, N. Y., opened a plant at 5851 W. 95th St., Oak Lawn, Ill., for the design, development, and production of complete test equipment and ground support equipment. Arthur V. Sommer is plant manager.

Fansteel Metallurgical Corp., North Chicago, Ill., has started operations in its $6.5-million tantalum-columbium plant at Muskogee, Okla. This plant is producing tantalum and columbium metal powders by a series of chemical, electrochemical, and powder metal-

(*Please turn to Page* 98)

Specify Michigan Tubing for economy and versatility
The ABC of MSIT
A Always makes possible
B Better products
C At lower cost

A Quality Product

ROUND

¼" to 4" O.D. 7 to 22 gauge

SQUARE	Gauge	RECTANGULAR
⅜" to ¾"	16 thru 22	⅜" minimum side to 5" maximum side
¾" to 1"	11 thru 22	
1" to 2"	11 thru 20	
2" to 3"	11 thru 18	

Carbon 1010 to 1025

Standard Sizes

Tube Diameter O.D. Size	Maximum Wall Decimal	BWG Gauge	Minimum Wall Decimal	BWG Gauge
	.065	16	.022	24
¼	.083	14	.022	24
½	.095	13	.022	24
⅝	.095	13	.022	22
¾	.095	13	.028	22
⅞	.095	13	.028	22
1	.095	13	.028	22
1⅛	.095	13	.028	20
1¼	.095	13	.035	20
1⅜	.095	11	.035	20
1½	.120	11	.035	20
1⅝	.120	11	.035	20
1¾	.120	7	.035	20
1⅞	.180	7	.035	20
2	.180	7	.035	20
2⅛	.180	7	.035	20
2¼	.180	7	.035	20
2⅜	.180	7	.035	20
2½	.180	7	.035	20
2⅝	.180	7	.035	19
2¾	.180	7	.042	19
2⅞	.180	7	.042	19
3	.180	7	.042	19
3⅛	.180	7	.042	18
3¼	.180	7	.049	18
3⅜	.180	7	.049	18
3½	.180	7	.049	18
3⅝	.180	7	.049	
3¾	.180	7		
3⅞	.180			
4				

For 40 years

Michigan has been manufacturing tubular parts for leading manufacturers. This acceptance of Michigan tubing has been won by meticulous attention to customer requirements and the supplying of the very best in tubing. The following advantages of low cost manufacture and utmost dependability are yours when you specify Michigan for tubular parts in the fabrication of your products:

1. It is fabricated in round, square and rectangular shapes, in a wide range of sizes;
2. It is always of uniform strength, weight, ductility and weldability;
3. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted and rolled.
4. Complete facilities for the COLD DRAWING, ANNEALING and TESTING of tubing we manufacture.

Michigan ELECTRIC RESISTANCE WELDED STEEL TUBING THE OLDEST NAME IN STEEL TUBE PRODUCTS CO.

Consult Michigan for engineering and technical help in the selection of tubing best suited to your needs.

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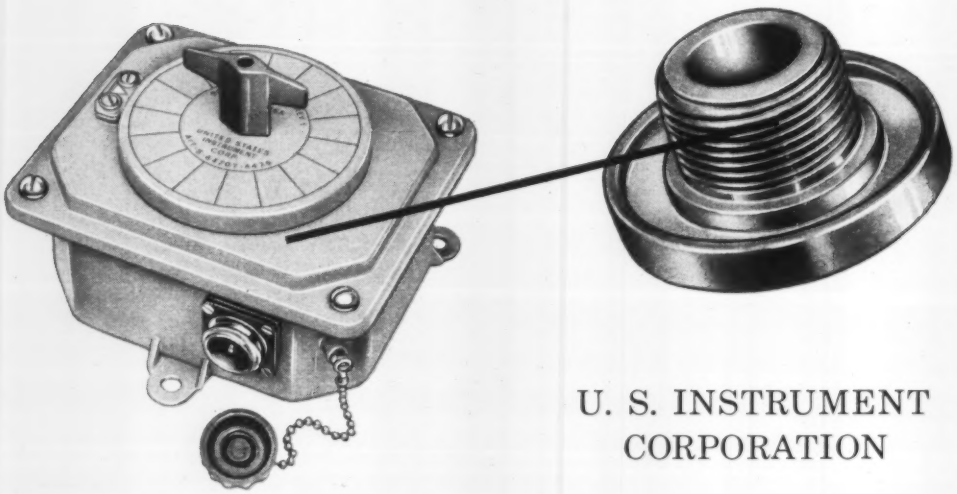
FACTORIES: Detroit, Michigan • Shelby, Ohio

DISTRIBUTORS: Steel Sales Corp., Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—Service Steel Div., Van Pelt Corp., Los Angeles, Calif.—Donald A. Harston, Cleveland, Ohio—Globe Supply Co., Denver, Colo.—W. A. McMichaels Co., Upper Darby, Pa.—William P. Hall & Associates, Dayton, Ohio—John Emery West, Miami, Florida—Gary A. Osborne, Buffalo, N. Y.—Earle M. Jorgensen Co., Houston, Texas

Three more nationally known manufacturers select Mueller Brass Co. Forgeable Bearing Alloys for vital components of their products

In ever-increasing numbers, Mueller Brass Co. specialized alloys are being specified by manufacturers of top-quality products. In a series of continuing advertisements, we have presented case histories of successful applications, to which we now add three more distinguished companies who are incorporating Mueller Brass Co. forgeable bearing alloys in their products to meet the demands of widely divergent operating conditions.



U. S. INSTRUMENT CORPORATION

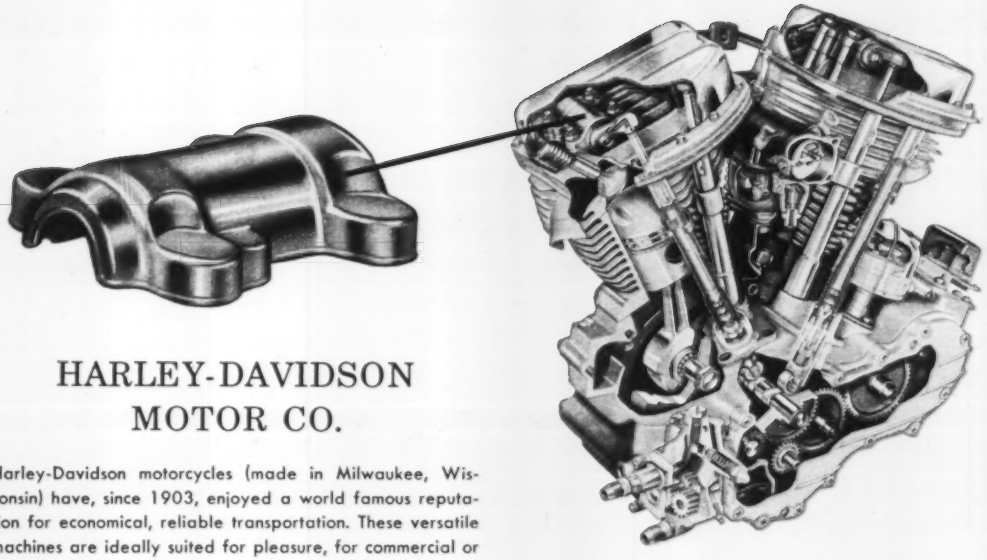
U. S. Instrument Corporation, Charlottesville, Va., selected abrasive-resistant Mueller bronze alloy bushings for their remarkable telephone selector switches after exhaustive tests of many materials. A vital communications link on today's U. S. Naval vessels, these sound-powered telephone circuits must meet rigid Navy performance-standards. Such phones, for example, must have selector switches which are capable of rotating for a minimum of 50,000 torturous cycles . . . 360° clockwise, followed by 360° counter-clockwise. In addition, the "O" ring must still form a water-tight seal AT THE END OF THE TEST! Of the many tested, a Mueller Brass Co. special manganese bronze alloy was the best one meeting these rigid specifications.

There were other important reasons why these bushings were chosen by U. S. Instrument Corporation for this application. Resistance to abrasive action against the rubber "O" ring was a prime one . . . then, too, the stem assembly suffered severe pounding through the action of the indexing mechanism which, prior to the use of the Mueller Brass Co. alloy, caused repeated seizure of the component parts. In this particular application, the part was fabricated on an automatic screw machine rather than produced as a forging. The versatility of Mueller Brass Co. alloys makes them readily adaptable to the most economical method of fabrication dependent upon the size, shape, and end-use requirements of the part.

In commenting on the success of this part, U. S. Instrument Corporation praised the alloy for its tensile strength (ordinary brasses could not withstand the 2000 ft. lb. impacts without deformation), for its machinability and corrosion-resistance.

40 MUELLER BRASS CO. 1917-1957

MUELLER BRASS CO.



HARLEY-DAVIDSON MOTOR CO.

Harley-Davidson motorcycles (made in Milwaukee, Wisconsin) have, since 1903, enjoyed a world famous reputation for economical, reliable transportation. These versatile machines are ideally suited for pleasure, for commercial or business use, as well as the grueling demands of law enforcement work. Harley-Davidsons boast a dependable engine . . . one which can roll up an astounding mileage record with little or no care. The painstaking selection of every engine component is one important reason for this reliability. The new twin-cylinder Harley-Davidson 74 OHV employs Mueller Brass Co. bronze alloy forgings in the form of rocker-arm bearing caps. Subjected to violent temperature changes, fast starts and stops and road shock, Mueller forgings are proving again and again that they have the ability necessary to withstand almost any punishment . . . and still provide unfailing service.

JACOBSEN MFG. CO.

Jacobsen Mfg. Co., Racine, Wisconsin, was among the first to produce a practical power mower for home use. That was more than 35 years ago! Today, Jacobsen power-mower dependability is evident itself in more than a dozen gleaming new models such as the popular Pacer, Lawn Queen, Manor and others. One of the most reliable components in the always dependable Jacobsen hi-torque engine is a Mueller Brass Co. connecting rod forged from special bronze alloy. Jacobsen mowers with Mueller-forged connecting rods are called upon by some commercial users to operate as much as 8 hours daily, 6 days a week . . . perhaps as much as 2000 hours a year. In searing summer temperatures, thru hours of constant operation, the high uniform strength of Mueller bronze forgings constantly withstands pounding and vibration with the same conspicuous success as in its many other applications.

Why not investigate these specialized alloys for your own products. We welcome your inquiries. Our engineering staff will be happy to make specific recommendations. Both on the proper alloy and the best method of fabrication to meet your needs . . . exactly. Our engineering manuals show many, many examples of how American manufacturers have used these alloys to great advantage.

• WRITE TODAY FOR THE ENGINEERING MANUAL YOU NEED

Mueller Brass Co. Forgings
Engineering Manual H-58565 ☐

Tuf Stuf Aluminum Bronze Alloys
Engineering Manual H-58563 ☐

"600" Series Bearing Alloys
Engineering Manual FM-3000 ☐

Copper Base Alloys in Rod Form
Engineering Manual FM-3010 ☐

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P O R T H U R O N 2 6 , M I C H I G A N

DURALOY

A good example of our
WELDING
TECHNIQUE

SEND FOR YOUR COPY of our New General Bulletin.

in connection with high alloy casting

This tube support is 21'6" long; 6'7" wide and weighs 8900 pounds. It looks like a single casting. Actually it is made up of three sections welded together in zig-zag strips across the face. It's a Duraloy HH casting destined for an oil refinery cracking still.

Welding is assuming greater and greater importance in the production of high alloy castings. Often it is the only way to produce large tonnage or unusually shaped pieces. During our many years of experience in producing both high alloy static and centrifugal castings, we have developed sound welding techniques for such castings. Carbon steel welding techniques won't serve. It takes special know-how for chrome-iron and chrome-nickel.

You can rest assured that if the chrome-iron or chrome-nickel castings you order from us require any welding, it will be done skillfully.

The DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.
EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
ATLANTA OFFICE: 76—4th Street, N.W.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

(*Concluded from Page* 95)

lurgy processes, beginning with ores. Production of ingots will get underway next month.

General Electric Co., Schenectady, N. Y., will build a $4-million testing facility at its Evendale, Ohio, plant. It will be used to simulate high altitude and high speed flight conditions for ram-jet engine tests. The test facility will be an arm of the GE Jet Engine Dept., where several prototype engines are under development.

Simonds Saw & Steel Co., Fitchburg. Mass., opened its new southern branch in the Freestate Industrial Park area of Shreveport, La. The branch is a distribution, sales, and service center and will stock cutting tools made by the firm and products of its subsidiaries, Simonds Abrasive Co. and Heller Tool Co. Branch manager is Fred W. Ziegler Jr.

ASSOCIATIONS

P. W. Schipper, Howard Foundry Co.'s Investment Casting Div., Milwaukee, was elected president of the **Investment Casting Institute,** Chicago.

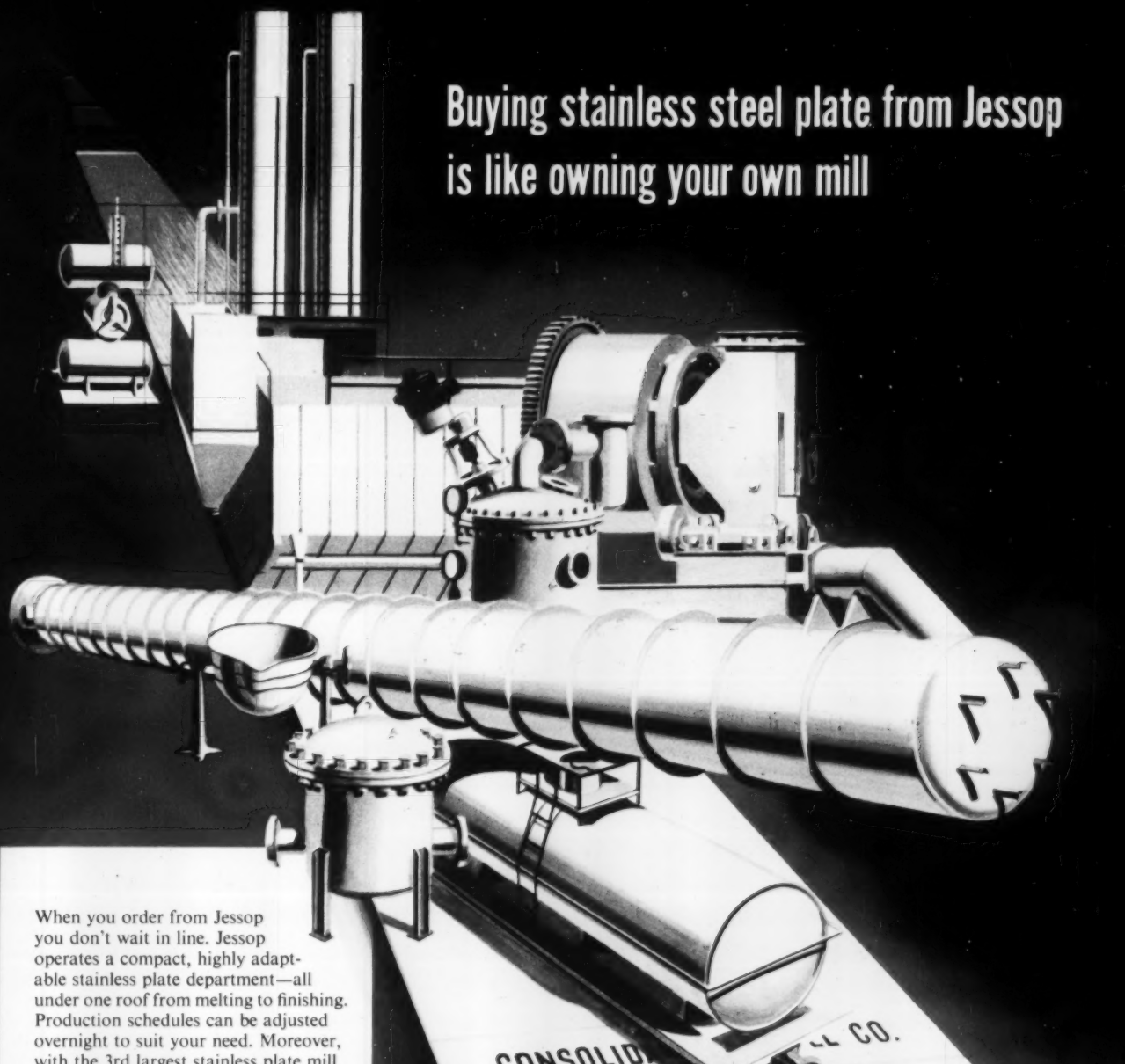
V. W. Coddington, Lakeside Bridge & Steel Co., was elected president of the **Society of Iron & Steel Fabricators of Milwaukee.** Other officers are: Vice presidents, Eugene Zielsdorf of C. Hennecke Co. and H. A. Trimborn of Milwaukee Bridge Co.; treasurer, A. D. Mayer, Milwaukee Bridge & Iron Co.; and secretary, G. H. Abendroth, Worden-Allen Co.

NEW ADDRESSES

Charles Dreifus Co. and **Dreifus Steel Corp.** moved to larger quarters in the Somers Bldg., 8 Cynwyd Rd., Bala-Cynwyd, Pa.

Tipptronics Inc., manufacturer of electromechanical devices for the control and monitoring of industrial equipment, has transferred its operations to Chagrin Falls, Ohio.

Buying stainless steel plate from Jessop is like owning your own mill



When you order from Jessop you don't wait in line. Jessop operates a compact, highly adaptable stainless plate department—all under one roof from melting to finishing. Production schedules can be adjusted overnight to suit your need. Moreover, with the 3rd largest stainless plate mill in the country now in operation, sizes are available up to 80″ in width and 240″ in length. And Jessop's years-ahead chemical control equipment quickly identifies tramp elements in the molten bath—permits their removal so you will enjoy improved forming and welding characteristics in the finished plate. You'll find it will pay to send your next inquiry to Jessop where doing business is like owning your own mill.

CONSOLID… CO.

To: JESSOP STEEL COMPANY

Quantity

Description

Rush!

JESSOP

DELIVERED

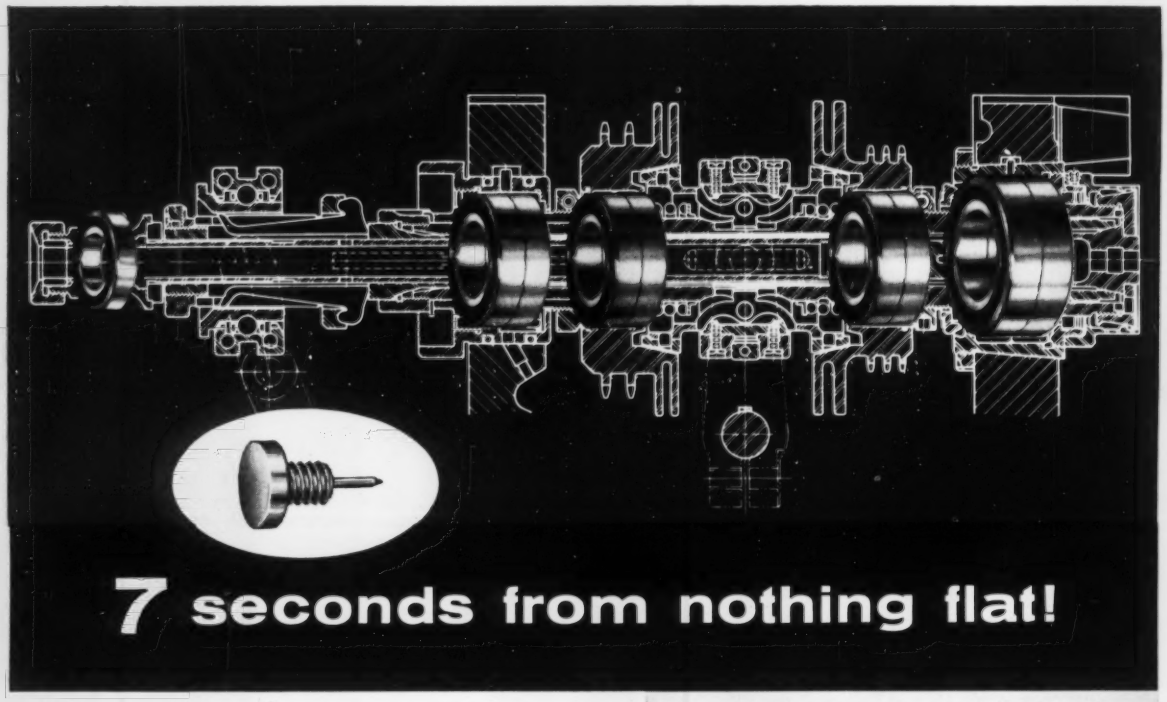
STEEL COMPANY · WASHINGTON, PA.

OFFICES IN PRINCIPAL CITIES

Wholly-owned Subsidiaries: Jessop Steel of Canada Limited, Wallaceburg, Toronto

Jessop Steel International Corp., Chrysler Building, New York, New York

Green River Steel Corporation, Owensboro, Kentucky



7 seconds from nothing flat!

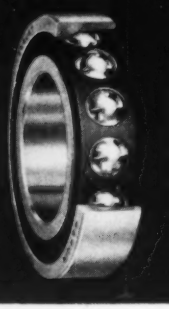
The brass part illustrated below the diagram is produced on the new 00 Brown & Sharpe Automatic Screw Machine in 7 seconds. That represents a 42% increase in production over the previous model.

To step up production by such a substantial percentage involved the development of new and exclusive features for the 00 machine over and above those proven so successful on the previous model. Included among them is the chain-driven, ball bearing spindle . . . see large diagram above.

In the selection and application of the bearings for the 00 spindle, Fafnir engineers worked with Brown & Sharpe engineers. The 208 speed combinations from a high of 7200 RPM to a low of 34 RPM, permitting high cutting efficiency on a wide range of materials, presented no ordinary problem for bearings. The bearing arrangement shown meets an exacting demand for maximum radial and axial rigidity to assure true balance and running accuracy of the spindle.

Could be there's no place in your machines for these super-precision bearings. But, whenever bearings are involved, there's certainly a place in your product planning for the Fafnir "attitude and aptitude" — a way of looking at bearing problems from the designer's viewpoint plus coming up with the right bearing to fit the need. Ask your Fafnir representative for details. The Fafnir Bearing Company, New Britain, Conn.

The New Brown & Sharpe No. 00 Automatic Screw Machine with Fafnir-equipped spindle.



Fafnir preloaded, angular-contact, super-precision ball bearings with composition or brass retainers are made to highest industry-approved tolerances. Single or duplex bearings like this are used widely on spindle applications.

FAFNIR
BALL BEARINGS
MOST COMPLETE LINE IN AMERICA

Technical Outlook

COMPUTER FLIES JET—Hughes Aircraft Co., El Segundo, Calif., says its Digitair, an airborne digital computer, can fit into the cabinet of a table model TV. Earlier digital computers have been room size. The computer flies jet interceptor aircraft, leaving the pilot free for tactical decisions. It can make 9600 computations a second, 6250 decisions a minute.

ZIRCONIUM PRODUCTS—Westinghouse has contracted with Firth Sterling for finished zirconium mill products (up to 40,000 lb per month). They'll be used in structural parts and fuel element cladding in nuclear reactor cores. Firth Sterling says it's the first integrated contract let to a single company for the melting and rolling of zirconium alloys.

STAINLESS FOR REACTORS—Castings can meet the x-ray specifications required for nuclear service. Herbert J. Cooper, Cooper Alloy Corp., Hillside, N. J., says progressive solidification will eliminate centerline shrinkage. A 3.5-degree taper (from the minimum metal sections along the centerlines toward the risers) is needed.

STACK SAVER—When the 70-ft exhaust stack for the continuous pickler at Acme-Newport Steel Co., Newport, Ky., showed signs of giving out, estimates of a repair job ran to several weeks. But it took only one day: The stack was given an epoxy coating made by the Fibre Glass Evercoat Co., Cincinnati. It's estimated that the stack now has a life of 12 to 15 years.

HEAT TO ELECTRICITY—Researchers at General Electric have developed an electronic device which converts heat directly into electricity. Experimental converters already have turned more than 8 per cent of applied heat into electric power. Possible applications: 1. Using the device to convert nuclear and solar energy into electricity. 2. As an energy source for artificial satellites. 3. As an accessory to steam turbines. All are in the early research stage.

STRONGER MAGNESIUM—The strength of magnesium ZK60A forgings (used for aircraft and missile parts) can be increased 40 per cent by solution heat treatment, reports Dow Chemical Co., Midland, Mich. For example, a large aircraft wheel forging was heat treated and aged to the T-6 condition. It showed a tensile yield strength of 44,000 psi and an ultimate tensile strength of 48,000 psi. With conventional T-5 aging, tensile yield strength was 29,000 psi, ultimate tensile strength 44,000.

PHOSPHOROUS AND L-D—An L-D converter is processing high phosphorus Thomas iron on an experimental basis at Pompey in eastern France. First results indicate a two-slag practice and slightly above normal oxygen consumption will produce the equivalent of Thomas steel, plus a byproduct slag that can be sold as fertilizer. About 0.3 per cent phosphorus hot metal is the present limit for single slag practice.

WOVEN WIRE BACKSTOP—The problem of stopping flying chips of titanium in a small area around a drop forge was solved by a woven wire curtain—it was produced by Cambridge Wire Cloth Co., Cambridge, Md. Solid steel barriers failed; the hard chips either ricocheted dangerously or ripped through it. Woven wire had just the right amount of flexibility to catch the flying metal, equalize the impact, and drop it to the floor. The company used 14 gage carbon steel wire in fabricating the curtain.

What You Can Do with Pilot Runs

1. Match a product to the best production method.
2. Evaluate design and tolerances for easiest production.
3. Evaluate unfamiliar production methods and equipment at minimum cost.
4. Train operators and supervisors for the new job.
5. Set up production control methods.
6. Estimate production costs and time cycles.
7. Check all tooling and machine setups.
8. Check suppliers' parts and components.
9. Verify material specifications.
10. Turn out production models of a new product for evaluation and testing.

Pilot Runs Up Your Odds

They give you a chance to spot errors and trouble spots before they become costly mistakes. Look for the technique to be extended to repeated small runs

IN THE first month of production on a new product, a major metalworking company poured more than $1 million into an effort to get manufacturing costs down and product quality up. Ultimately, the whole project was dropped.

Asked what went wrong, the manufacturer flatly states: "We weren't smart enough to try pilot production first. We are sure that with pilot runs, we could have solved our problems for a fraction of the money we wasted in the production plant."

Most men who've worked with pilot programs think the idea will be used more widely in the next few years than ever before. Pilot production takes the trial and error out of production by duplicating it on a small scale. It's an effort to learn dollar lessons for cents. The trend toward cost cutting and the competitive entry of new products into the market will lead to its growth.

Example—Chevrolet has a new pilot production department at its Flint, Mich., assembly plant. The area is 50 by 200 ft and includes a plant spray booth and oven. Last August, a skeleton group of assembly equipment was set up, and selected production men began building the 1958 Chevrolets.

They put a car together with standard production methods, then checked all assemblies and components. During the pilot period, 27 cars were built. Nearly 200 changes in the car or the tooling resulted directly from the pilot experience.

T. M. Schooley, Flint plant manager, says: "Never before have we been able to get into peak-quantity production as fast as we did this year. We started our full production runs on the new model on Oct. 7. Since then, we haven't had a single job failure. All of us give the pilot program a lion's share of the credit."

Benefits—The Chevrolet story points up the big gain some makers are getting from pilot operations: Once production begins, its chances of going smoothly are greatly enhanced if you've already checked the product and the manufacturing process.

When management at Rheem Mfg. Co., Chicago, decided to build glass-lined water heaters, they realized they needed porcelainizing knowhow. Three newly hired ceramic engineers (they would later head up production of the new tanks at Rheem plants) went to work in three custom enameling plants. For about eight months, raw tanks built in the Rheem plants were shipped to the enameling plants to be glass coated. In addition to the ceramic engineer, each Rheem crew working at the outside plant included a millroom foreman and a control or key production man.

According to Littleton Price Jr., director of research and develop-

Farm It Out?

HOW CAN you be sure a change in the process will give you what you're looking for? One way is to make pilot runs on someone else's equipment before you buy.

Here's an example: An $80,000 research and development laboratory for metal powder parts has been set up at F. J. Stokes Corp., Philadelphia. The lab has a complete range of presses (a 50-ton model is shown), mixing and blending equipment, a controlled-atmosphere sintering furnace, and a host of testing equipment. Stokes executives point out the laboratory can turn out pilot-scale experimental work under conditions that are nearly identical to normal production operations.

Manufacturers who want to consider metal powder parts for their products can make pilot tryouts at Stokes without committing capital for equipment. Pilot runs can show what powder mixes to use, what equipment is needed, prove part cost, tooling, and production rates.

The approach can be used on most other production techniques.

ment at Rheem's Home Products Div., this work at outside plants, under contract with the owners, amounted to an excellent pilot run. While the work was going on, the three Rheem plants got the new production lines for the tanks.

How did it pay off? Here's what Mr. Price has to say: "We figured what our production requirements would be in the second year and guessed that at the end of the first year we'd be turning out the new tanks at 50 per cent capacity. Actually, at the end of seven months, we had the lines running at full capacity. The pilot program, and what we learned from it, is solely responsible for our success."

A Match—Pilot production is designed to assure such production successes by mating the product design to the production technique.

Rheem's pilot runs showed a design error in the joint between the tank wall and the head. The correction was made before full production began. In 1953, a pilot run at Motorola Corp., Chicago, on color TV sets pointed up design problems that resulted in the suspension of the project. Motorola's entry into color was delayed for nearly two years, but the company was spared the terrific cost of putting out an inferior product. In both cases the same lessons could be learned in full production, but the experts agree that the costs of finding out would be tremendous.

Chevrolet's Mr. Schooley points out that the checks on production and tooling are as important as those on the product. Chevy's pilot experience this year showed up a trouble spot—the compression of coil springs for assembly. Result: A Chevy-designed tool now does the job on the line; it not only makes the operator's job easier and faster, but it eliminates the danger of a spring getting away from him before it's secured.

Other Benefits—Chevrolet's pilot program at Flint serves ten assembly plants. Key supervisors and operators from all ten had a hand in the preproduction trials. Mr. Schooley says this accounted for two gains: By rotating crews, more men had a chance to evaluate product and tooling and to suggest improvements. Equally important, men from every plant learned about the new car and the techniques for building it. Their familiarity with the job undoubtedly made production easier.

The advantage of personnel training is a key one. Pilot quantities of Rheem's heater tanks were run in outside plants to give production men the opportunity to

How To Make It Work

Pilot production can be made to pay off in a wide variety of production conditions. Here are some ways to get the most out of it:

1. **Consider pilotwork especially when a new product or a new method is in the works. But use it only when it will pay its way.**
2. **Plan for it when the project is still in the idea stage, so money and time are allotted for it.**
3. **Make pilot tryouts on production equipment using production people. Don't assume that prototypes or what can be done in the laboratory or toolroom can be duplicated in production.**
4. **Augment it with co-ordinated engineering and production know-how during design stages.**
5. **Watch and analyze all steps during a pilot run. Look for chances to shortcut, simplify, or standardize. Look for troublesome operations.**
6. **Follow results and recommendations through into production.**

learn the ropes, then carry their knowledge onto the production line as soon as it got underway.

Here are other things you can do with pilot runs:

- Check purchased parts early enough to catch errors before the vender contract is set.
- Run thorough check on operation sequence and job timing.
- Make an accurate check of production costs.
- Learn how a production model will work. Performance may differ from that of hand-built prototypes.

Who Can Use It?—At first blush, pilot production looks as if it would be economically practical only for the mass-production industries. But the experts say its potential is a lot broader than most people suspect.

Henry Spitzhoff, management consultant with Robert Heller & Associates Inc., Cleveland, says that there is just one basic requirement: Your production run must be long enough to justify it.

So Chevrolet, Motorola, and Rheem pilots are naturals. Their production runs will be at high rates over long periods.

What about plants that work with shorter lots? Several experts told STEEL to look for pilot production to make its appearance in plants that haven't considered it up to now. They say it's particularly ripe for companies that have repeated runs of short lots. Machine tool builders, for example, may put pilot operations to work on parts for a radically new model. The machine may be built in lots no larger than ten, but it may be produced with only minor improvements and re-engineering over a period of five or ten years.

How To Do It?—At the high end of the scale is the pilot plant or the pilot line. Both are separate from the production plant. An example: When engineers at Ford Motor Co. wanted to use a new plating process for bumpers, a pilot line was set up and run at the Monroe, Mich., plant for 18 months before production began.

Pilot lines at Motorola are production lines with a skeleton crew anl less equipment. T. C. Stewart, director of industrial engineering, estimates the average pilot line is about one-fifth of a full production line for the same product.

Shortcuts—Only a few companies will be able to justify setting up a separate plant or line. More will use outside sources, especially when a process is involved. It's the way Rheem ran its pilot on glass-lined tanks.

Rheem also made pilot runs on a shotblasting machine at Wheelabrator Corp., Mishawaka, Ind., before the full sized production machines were built.

Many equipment manufacturers are setting up facilities to work with potential customers on trial jobs. It's simple and inexpensive to try new heat treating, machining, forming, and other production techniques. The new department at the F. J. Stokes Corp., Philadelphia, is an example. (See exhibit Page 103.) It will help manufacturers evalute powder metal parts for their own products.

Simplest of All — Authorities agree that the widest application should be in plants that can use their own production equipment for pilot runs on a new product. Pilot runs correspond to a first production order for the new product.

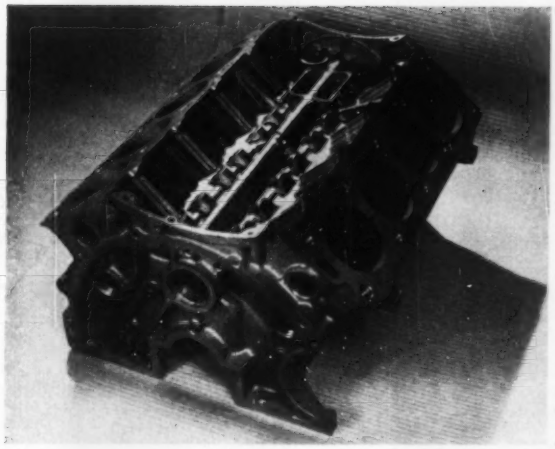
There is this difference, according to Mr. Spitzhoff: All production operations en route to the finished product are closely watched and recorded. Trouble spots are located, and the problems solved. Results of the runs are interpreted in terms of full scale production.

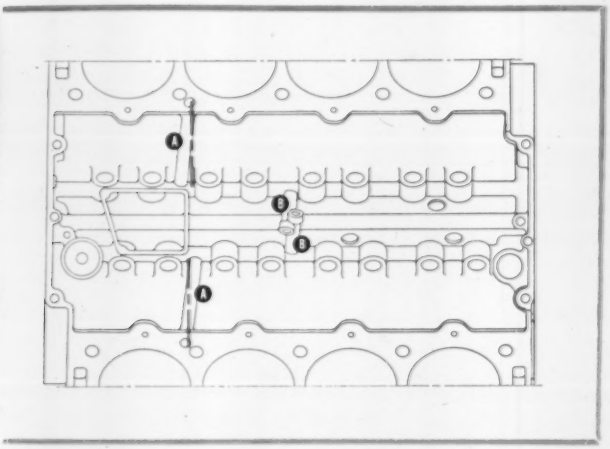
When and How—Some companies, like Motorola, pilot produce every new product, but generally, the technique is used only when the new product or new process is sufficiently unique and management feels there may be production problems. Few go into it when only minor changes are involved.

The decision on when to pilot and how much is usually left to engineering and production management. There are many variables, and only one or two components or a single production operation may justify piloting.

Tips—Here are some rules that will apply to all programs:

1. Plan for pilot operations early in the game. Decide how much time and money will be spent.
2. Observe what happens so prob-





Oil hole ribs (A) on this engine block interfered with machining operation on the valve lifter holes. To get needed clearance, engineers redesigned so holes go in on slant. Now the rib centers between adjacent lifter holes, giving clearance for machining. Other oil holes (B) also were slanted so they could be drilled at the same time as first pair. The redesign saved about $200,000

Machine Tryout Does Pilot Duty

IF YOU have to get new equipment for part of your production, don't overlook the chance to do some pilotwork during the equipment run-in. While the equipment maker is looking at machine performance, you can make checks on the product, product changes, and the process.

Case in point: The huge transfer machine is part of the setup for Edsel, Mercury, and Lincoln passenger car engines at Ford's Lima, Ohio, plant. It was first set up and run at Cross Co., Detroit. Ralph Cross, executive vice president, explains that his men were watching performance on dimensions, running a check on cycle time, and looking for flaws in fixturing and clamping and faulty tooling.

While that work was in progress, Ford designers decided to enlarge the water jacket surrounding the cylinders. It meant the casting would be thicker, and some tool clearances, particularly on valve lifter holes, would be reduced. Ribs surrounding two oil holes (marked A in the photo) would interfere with ream bushings. Instead of rough reaming all holes in one station, only alternate holes could be reamed at one time. It meant adding an extra rough ream station to the line and another for finish reaming. Three identical machines were involved, so the addition called for six stations.

Shift—Ford engineers and Cross machine designers worked out a simple solution. The oil holes were slanted so the ribs come midway between lifter holes. (See the illustration.) It gives the needed clearance for bushings; the holes are rough then finish reamed—16 at a time. A second set of oil holes (B) was slanted parallel to the first two so they could be drilled in pairs.

As a result of the runs at Cross (about 175 blocks went through the trial runs), Ford engineers got the water jacket and block design they needed, and they saved costly production machinery additions.

lems are spotted and solved before you go to full production.

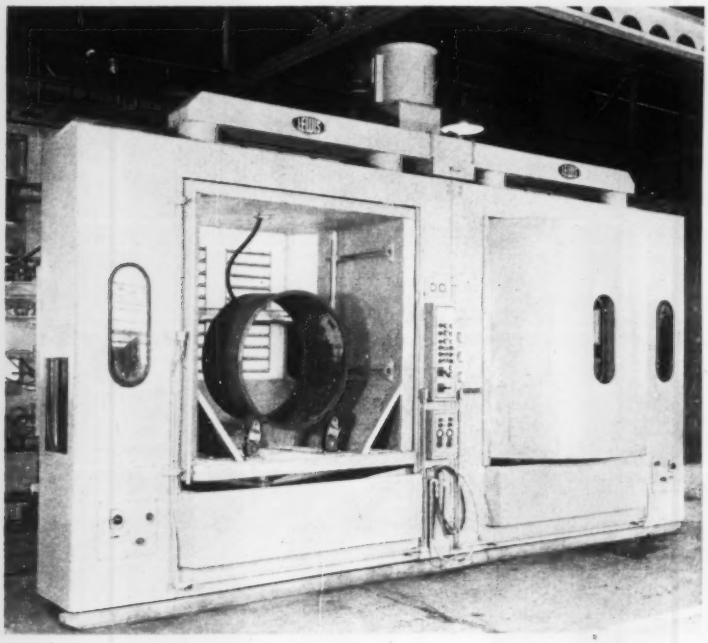
3. Interpret results in terms of full-scale production performance. What happens to a lot of 20 parts may not happen in one of 2000.

4. Use production facilities and personnel. Laboratory setups will only mislead. A machine operator may be unable to duplicate the job done by a toolmaker.

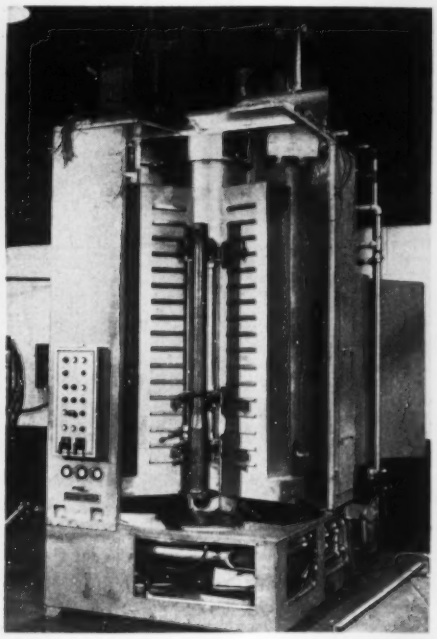
5. Follow through so experience is applied in production.

One industrialist told STEEL: "Pilot production is something we should be using regularly, but we never have had the time for it. We're sure we're pouring dollars down the drain by trying to change in production what we could have changed earlier for a fraction of the cost."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

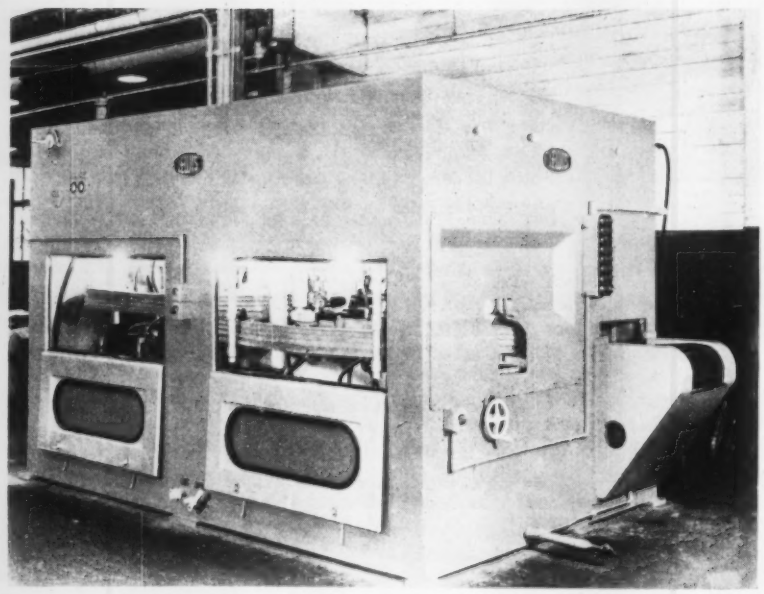


The entire surface of this stainless steel piece (about 30 in. in diameter and 20 in. long) is cleaned to remove heat treat scale. The piece is rotated, and liquid blast guns move across its surface



Heat treat scale is removed from both the exterior and interior of this tubular shaft. Blast guns move vertically as piece rotates

Wet Blast Finishing Goes Automatic



This automatic machine will be put into operation shortly at Thompson Products Inc., Cleveland, to finish jet blades. Two interlocking sets of moving belts will hold blades while they are cleaned by the liquid abrasive blast

A NEW automatic machine directs a stream of liquid abrasive from a blast gun to give metal parts a clean, ultrasmooth surface. It's being used to finish jet engine blades, other aircraft and missile parts, and components for automatic transmissions.

Principle—James T. Lewis Jr., president of Lewis Welding & Machine Corp., Bedford, Ohio, which developed the machine, says it combines two features that make the process fully automatic: 1. A method for handling parts to be finished which eliminates manual adjustment. 2. A new type of oscillating, air blast gun which is fed by an infinitely variable pump.

The finishing process is termed "microscopic peening" by Mr. Lewis. An abrasive-water slurry is blown against the metal surface. Abrasives used are aluminum oxide, silica, or glass beads in various degrees of fineness.

Example—The photograph at bottom of Page 106 shows a machine which will soon go into operation at Thompson Products Inc., Cleveland, to remove heat treat scale and polish jet engine blades. One operator will process 320 blades per hour.

The handling mechanism enables the process to automatically finish different size blades. It depends on two interlocking sets of moving rubber belts.

The piece to be finished is grasped between the first set of belts in such a way as to expose most of its surface to the high pressure spray from the oscillating guns. When the first part of the cycle is completed, the second set of belts picks up the piece on its finished portion and carries it through a second spray area.

The rubber belts grasp the piece with just enough force to hold it rigidly without damaging the surface of the metal or distorting its shape.

The double set of belts gives one continuous operation.

After the blasting operations are completed, the pieces pass through a rinse compartment where all the abrasive particles are removed.

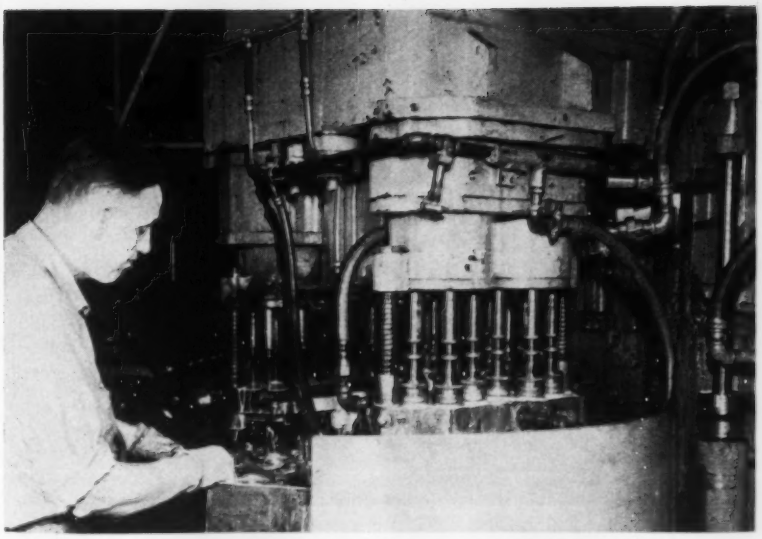
In addition to labor savings, Thompson Products expects to get a blade more uniform than those processed by manual methods.

Other Jobs—A number of similar machines have been placed in operation to finish aircraft and automotive parts. Five are used by Ford in its Cincinnati plant to finish automatic transmission parts. General Motors is using the process on transmission parts.

Cleveland Twist Drill Co. uses it to remove drawing compound on wire, 0.015 in. to 3/8 in. in diameter. Wire to be cleaned passes through the machine continuously.

Mr. Lewis says the process is especially suited for the removal of heat treatment scale, rust, and other undesirable surface conditions. It's also used to improve the quality of the surface and to provide a clean, smooth texture suitable for plating.

Practical tests have shown that the process works with a wide variety of materials, including aluminum, copper, mild steel, stainless steel, and titanium.



Operator loads two pinion retainers at a time. This multispindle machine drills, reams, and chamfers five holes. Setup eliminates another machining operation, cuts handling

Recess Tool Cuts Handling

Back chamfering on a rear axle drive pinion retainer is simplified by automatic recessing tool. Installed with drills and reamers, it can eliminate need for another machine

GOOD tool engineering eliminated a separate machining operation on a steel forging at Ford's chassis parts plant, Sterling, Mich.

The case points up the benefits of co-operation between process engineers and the field engineers of machine tool suppliers. They added Scully-Jones recessing tools and other drills and reamers to one machine, eliminating an inline operation requiring several machines and material handling.

Operation—Five holes are drilled in each of two retainers in a 30-spindle, Baker rotary drill. (The retainers are used with an auto rear axle drive pinion.) Two parts at a time are loaded and indexed for drilling, reaming, and chamfering.

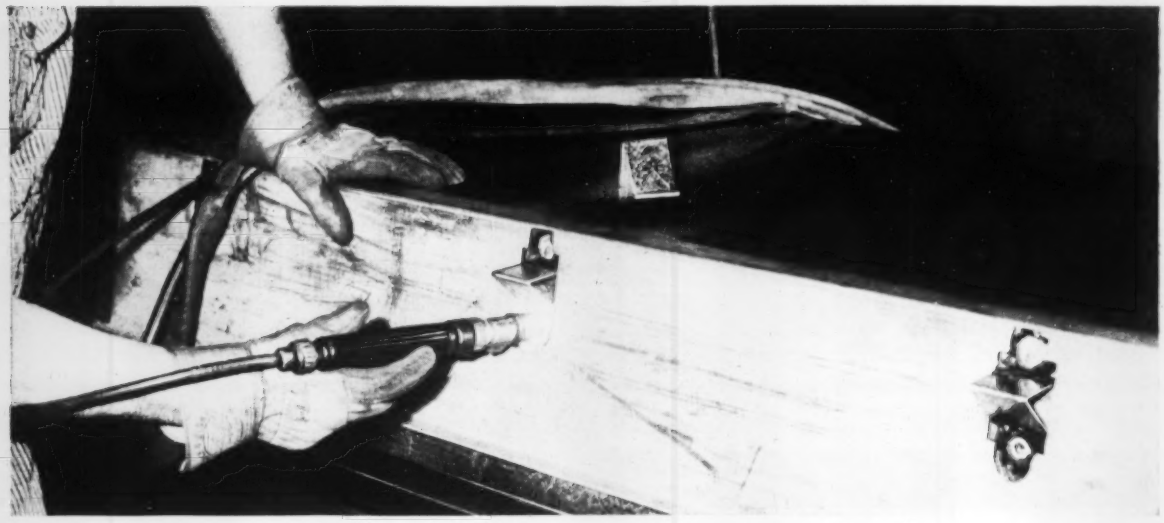
After drilling and reaming, parts are carried to the final work station for deburring and chamfering by Scully-Jones automatic recessing tools. They are mounted in a cluster of five. The tools feed down to chamfer top and bottom edges of the holes simultaneously.

When the stop collar contacts the face of the fixed pilot bushing, the radial feed of the chamfering tool is actuated. Its movement is controlled by a lead cam inside the toolholder.

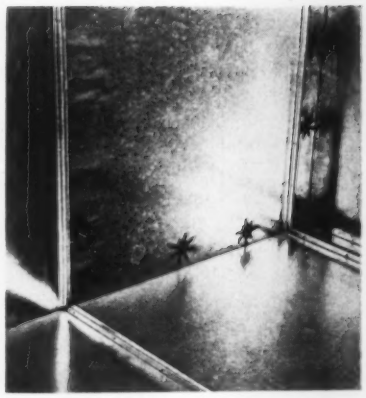
Positioning of the cutting tool and the cutting cycle are fast and positive. Position and depth of cut are closely controlled.

Tool Changes—If a different part requires another chamfer, the circular form cutter can be changed quickly. When the machine is retooled for other parts, the recessing tools can be changed by replacing the tool bit holders or form cutters.

The machine will also cut reliefs, grooves, back faces, counterbores, and necks.



Operator fastens bracket to side of refrigerator frame. Light torch is easy to manage. Interior view (right) shows completed refrigerator frame. Welds only require access from one side



Spotwelder Speeds Assembly

Light, portable torch makes clean, corrosion-resistant spots; joins galvanized to stainless. Welds don't require vapor sealing and they last indefinitely

THE PORTABLE spotwelder in the top photo has increased output of refrigerator cabinets 350 per cent at Koch Refrigerators Inc., Kansas City, Kans.

The firm makes two types of units: Multideck market merchandisers and commercial, reach-in refrigerators.

Method—Cabinet shells used to be fastened with metal screws. They required: 1. Punched and dimpled holes. 2. Insertion of screws. 3. Vapor sealing of all protruding screws.

Two men made seven frames a day.

The portable spotwelder (Sigma) is made by Linde Co., a division of Union Carbide Corp., New York. With it, one man produces 12 frames a day.

Material — Shells are formed from 14 to 20 gage stainless steel sheets. They are lap spotwelded to galvanized steel sheets.

Sigma spotwelders employ a Linde HW-11 torch and an SWM-6 machine. Welds can be made from any position and require access to the joint from one side only.

It's an inexpensive way to join parts, says Linde.

The Koch firm uses Oxweld No. 63 coiled wire, 1/16 in. in diameter for the torch. Argon, flowing at 25 cfh, prevents atmospheric contamination of the weld zone.

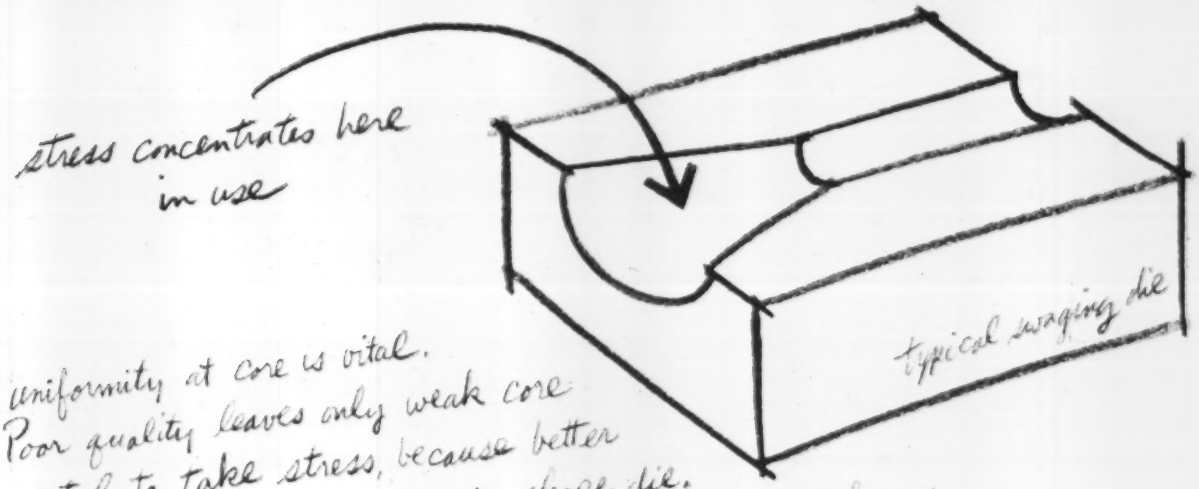
Spots are corrosion resistant. They require about 1 second to complete.

Conventional spotwelders require access to a weld area from both sides. Equipment also is heavier.

Versatile—The system can be adapted to welding heavier sections. One firm uses a similar device for hydroelectric turbine construction.

Stainless steel locking screws are used to fasten a heavy steel plate to the mild steel substructure of the turbine. Spotwelds are used to reinforce the screws.

The firm claims the device saved 44 hours per turbine and several thousands of dollars a year.



uniformity at core is vital.
Poor quality leaves only weak core
metal to take stress, because better
surface metal is cut away to shape die.
Mel-Trol alloys, uniform throughout, eliminate weakness,
broken dies, too-rapid wear resulting from
poor centerline quality often found in ordinary steels.

MEL-TROL

. . . produces the first alloys with really predictable performance right through the core

Until now, it's never been possible to look at the alloy bar and be sure its center is as sound as its surface. Sometimes centerline weakness won't show even in a cross section. But it *will* show in rejects, breakage, rapid wear. The swaging die illustrated is just one example.

Carpenter Mel-Trol alloys are the answer to problems involving core quality. They are completely uniform, free from segregation, porosity and center separation. Carpenter's exclusive Mel-Trol process is the reason.

Mel-Trol is an integrated system of quality controls using patented Carpenter-developed equipment and methods supplemented by the most modern equipment commercially available. Mel-Trol is a part of the steel-making process from scrap selection through final preparation of stock shapes. It is the only process ever successful in producing truly uniform specialty alloys in mill lots.

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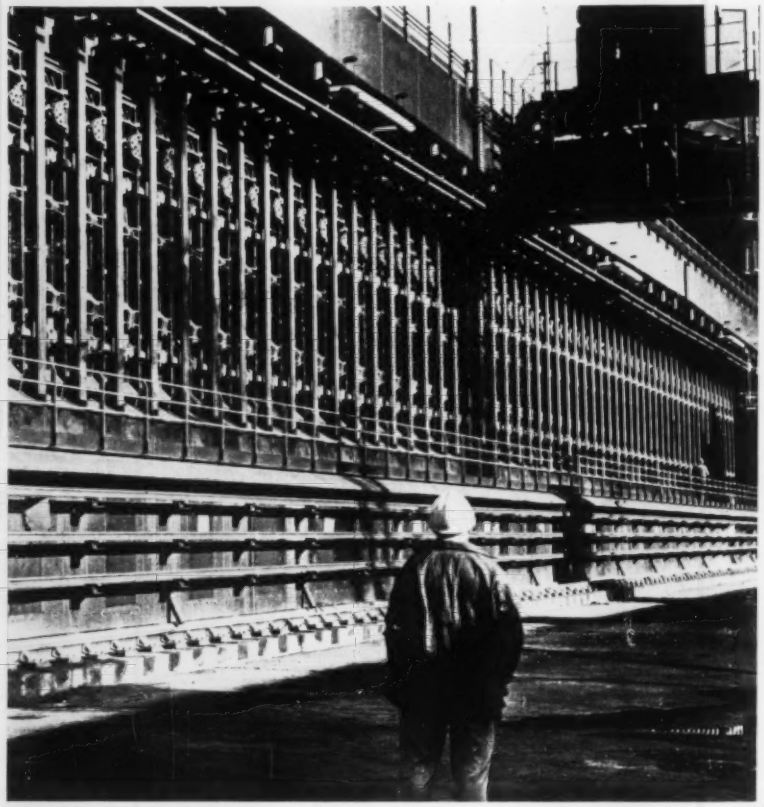


Ductile iron doors on Koppers byproduct coke ovens at Indiana Harbor Works of Inland Steel Corp.

Ductile Iron Moves In

There are few departments of the steel plant where this versatile material has not found wide use, both in original equipment and replacement parts

VERSATILE ductile iron, eight years old this year, is already well established in the steel plants. As an original equipment and replacement material, its uses are growing fast. A recent International Nickel Co. Inc. survey reveals these applications:

Sintering Plants—Since its inception, ductile iron has been considered for sintering pallets because of its improved strength and oxidation resistance. At least 12 plants are now using them for conventional iron ore sintering. Some are trial applications, but operators in the Cleveland, Youngstown, and Chicago areas have standardized on ductile iron pallets.

One of these reports ductile iron is giving three times the life of gray iron based on five years of experience. Two foundries are producing the pallets against standing orders and one of these companies markets a finished pallet assembly which includes flame-hardened wheels, also in ductile iron. McDowell Co. Inc. is using ductile iron for pallets on original equipment.

Some plants have found that ductile iron containing approximately 5 per cent silicon will outperform the regularly used gray or malleable iron for grate bars. Silicon at this level tends to decrease the ductility of the iron so that most success has been encountered with the short "finger" type grate bar.

Coke Ovens—One of the most successful applications has been byproduct coke oven doors of the type recently installed at the Indiana Harbor plant of Inland Steel Co. (see photo, left). These doors were made of Grade 60-45-10.

Since 1953, about 1000 ductile iron doors have been put into service. Some have been in use for more than three years.

With ductile iron it was possible to build a light door having greater strength that is easy to manipulate and is resistant to mechanical abuse and heat distortion. They are also more economical to make since shop time is saved by casting the hardware integrally. Oxidation resistance is not a factor if the door is properly lined with refractory. Less heat distortion means tighter seals, less oven leakage, and higher process efficiency.

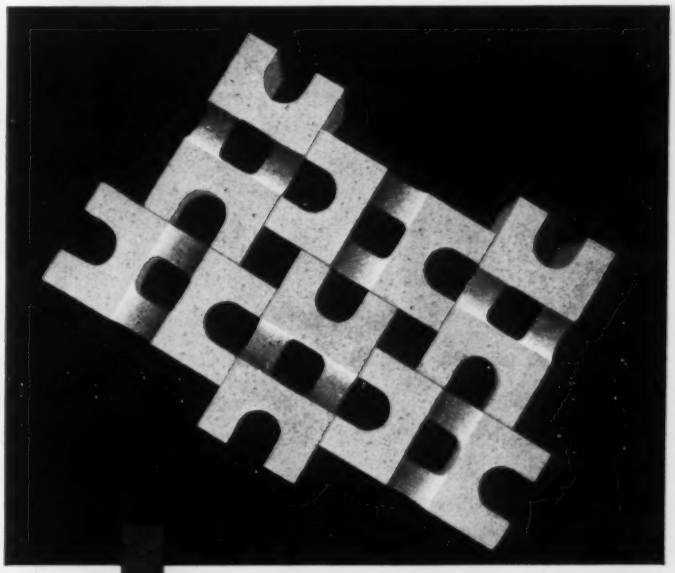
Because of its high strength and good heat resistance, the material has been used for ascension pipe elbows which are part of the oven assembly which collects the hot gas. Coke oven charging hole frames, lids, and pusher shoes have also been made of ductile iron.

Quenching Cars — The use of ductile iron castings has appreciably lengthened the life of coke-quenching cars used by Youngstown Sheet & Tube Co. and other large steel producers (see photo, Page 112). Four plants have standardized on it for this use and three others have made trial installations. At Youngstown's Brier Hill (Ohio) Works, the first test of ductile iron consisted of four bottom plates which had been installed experimentally in one of the cars alongside the ordinary steel plates. At the end of 12 months the iron plates were flat and showed

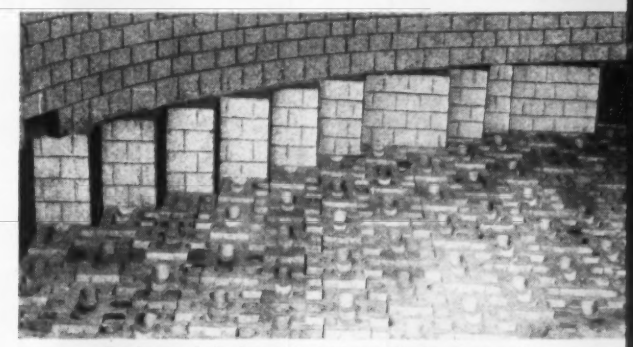
New design provides

25% to 50% GREATER HEATING SURFACE

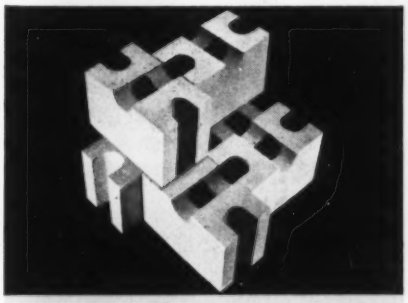
than ordinary basket weave checkers



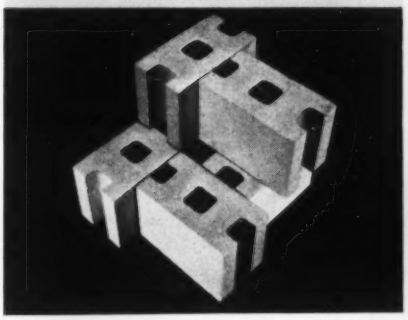
KENNEDY BLAST FURNACE STOVE CHECKERS



Tendency of checkers to twist in service is overcome by pilaster wall construction of the Bailey Hot Blast Stove.



The regular Kennedy Checker (above) is of 3-hole design with unobstructed flue openings, 1¼" minimum wall thickness and a cross flue. It also can be furnished (below) without the cross flue feature.



This new 3-hole checker shape is laid in basket weave style to produce a solid 1¼" wall between each flue. This assures greatly increased heating surface without sacrificing the advantages of basket weave design.

The increased heating surface of the Kennedy Checker results in a correspondingly lower stack temperature. This makes possible the use of a modern steel bottom for supporting the checker system.

Write for Bulletin

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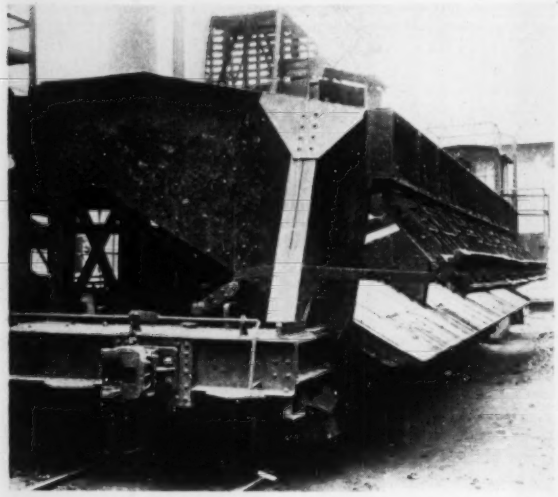
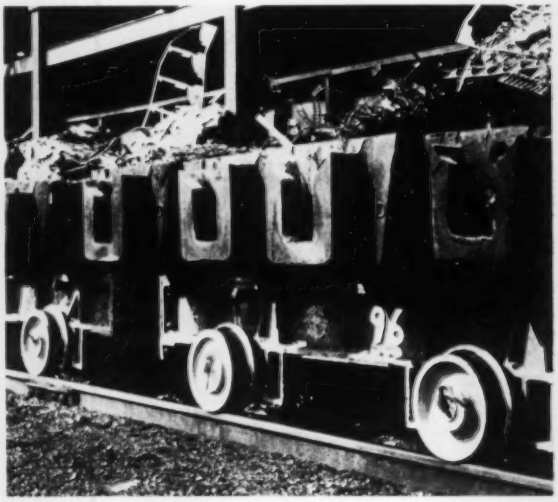


Coke quenching car lined with ductile iron plates at Brier Hill Works of Youngstown Sheet & Tube Co.



Ductile iron charging boxes in the open-hearth shop of Sharon Steel Corp. in Sharon, Pa.

DUCTILE IRON . . .

little wear. During the same period, several of the steel plates warped and had to be replaced.

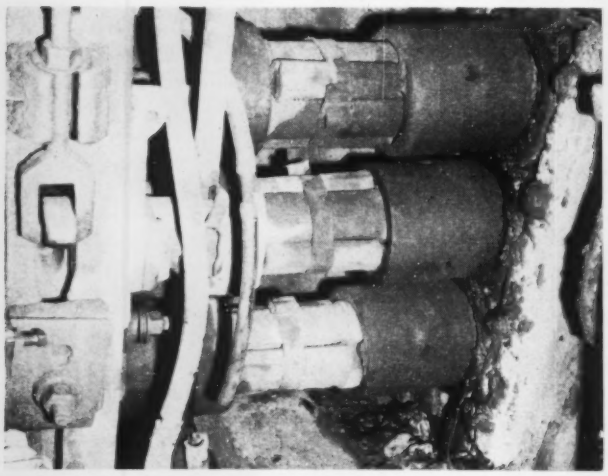
Following this, another car was rebuilt with ductile iron end plates, back plates, and diaphragms. After 18 months, all the ductile iron parts were still serviceable. A ductile iron door lasted six months before it needed patching whereas cast iron doors cracked and needed repair in two months.

Ductile iron is now used for all car parts which contact the hot coke including bottom, end, and back plates; diaphragms, doors, and door hinge brackets. Average life expectancy in this application is three or four times that of ordinary steel or cast iron. Only the annealed 60-45-10 grade is recommended for these and other applications which involve s e v e r e thermal shock.

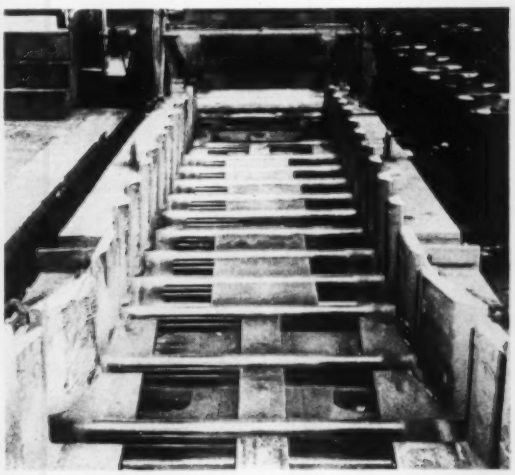
Blast Furnace—One type of pig iron mold conveyor has ductile iron links, pins, and wheels. The links are 60-45-10 grade and the pins have been heat treated to about 400 Bhn for optimum wear and strength. Wheels are furnished in the as-cast condition, or they may be hardened for additional wear resistance. Chill cast wheels have also been furnished.

By employing different heat treatments, a single composition is being used to meet the requirements of toughness to withstand shock loads and high hardness for wear resistance. Four plants reported using pig mold conveyor parts in ductile iron.

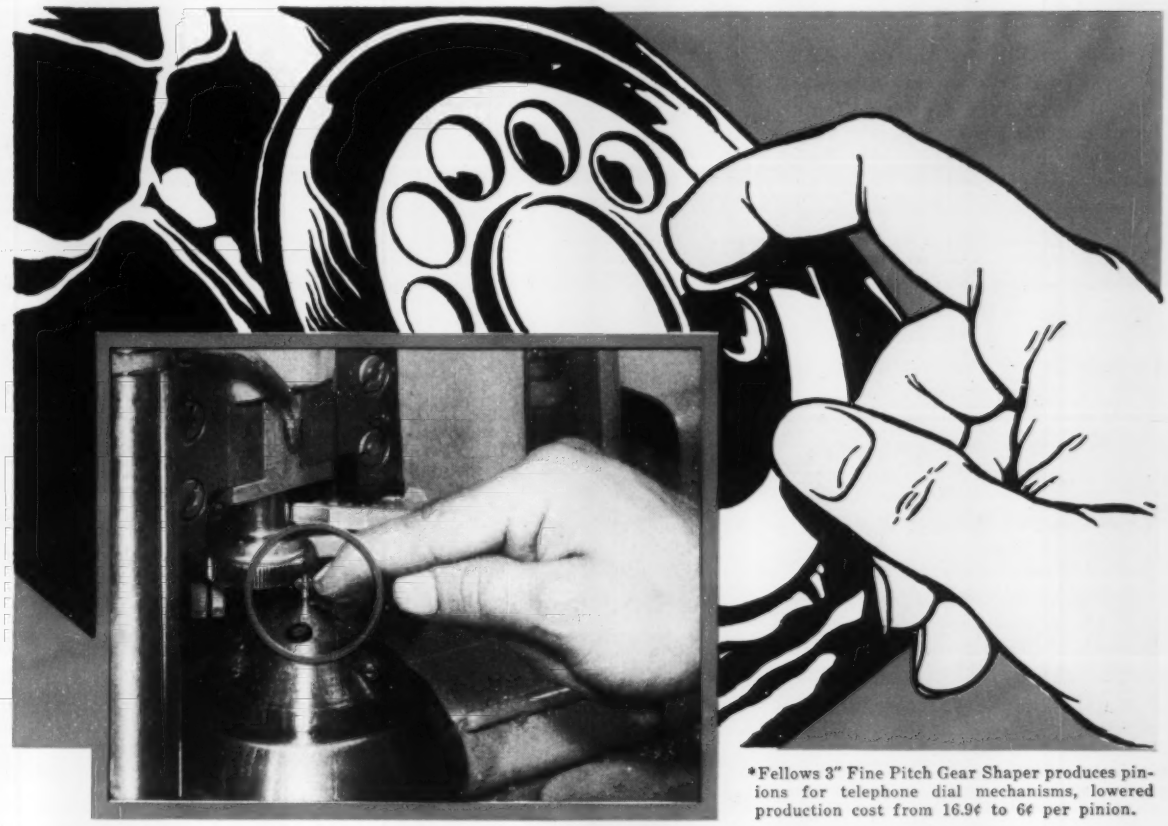
Open Hearths—Open-hearth operators report using ductile iron charging boxes (above), ingot hot tops, and slag flushing spouts. All of these applications feature the



Bar mill spindles and coupling boxes of ductile iron which have given four times the life of cast steel couplings



Ductile iron runout table rolls on 54-in. hot strip mill at Weirton Steel Co.



*Fellows 3" Fine Pitch Gear Shaper produces pinions for telephone dial mechanisms, lowered production cost from 16.9¢ to 6¢ per pinion.

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annealed grade which has the most ductility and resistance to thermal shock. Other uses are for refractory hangers, and dampers.

Sharon Steel Corp. has purchased more than 200 charging boxes and at least two other plants have trial quantities in service. Allegheny-Ludlum Steel Co.'s plant at Brackenridge, Pa., has used ductile iron hot tops for two years and some 2000 castings have been put into service. Advantages reported over cast iron are less heat cracking, less trunnion breakage.

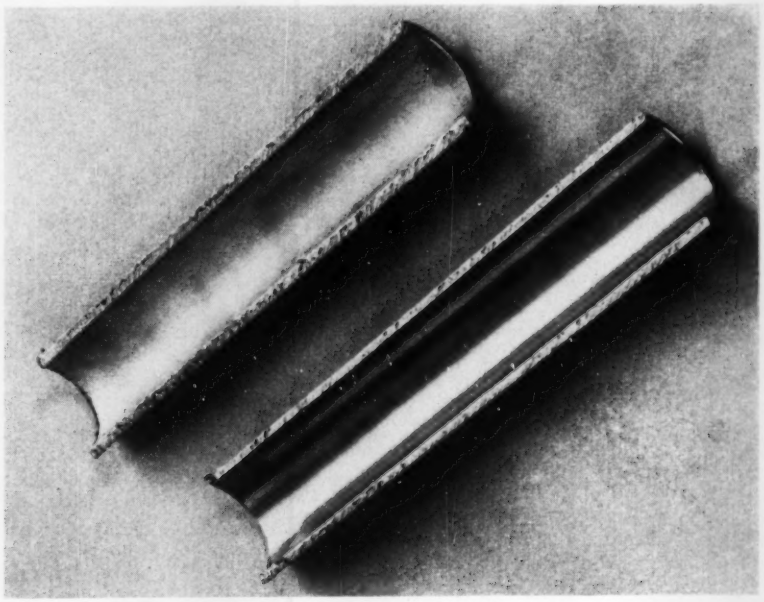
Rolling Mills — Bar and billet mills are using ductile iron for a variety of applications including heating furnace doors, mill guides, cooling bed racks and skids, side guards, apron plates, table rolls, transfer table sheaves, spindles, and coupling boxes (see photo, Page 112).

During 1956, more than 50 plants in the U. S. engaged in metalworking made purchases of ductile iron mill rolls. (Ductile iron roll production increased from approximately 500 tons in 1954 to 2600 tons in 1956.) The greatest use is in replacing flake graphite iron rolls for hot working service. The principal advantages reported are greater machinability, better resistance to fire cracking, and reduced neck breakage.

Ductile iron table rolls are used in National Steel Corp.'s new 54-in. hot strip mills at Weirton, W. Va. Ductile iron runout table rolls are also standard in large hot strip mills in Cleveland and Chicago. These are usually furnished as Grade 80-60-03 with the chemical composition adjusted to provide a hardness of about 240 Bhn which combines strength with a high level of wear resistance. Consolidated Western Steel Div., U. S. Steel Corp., uses ductile iron at a slightly lower hardness for conveying pipe up to 36 in. diameter.

Rolls having a hardness of 65 Shore Scleroscope are regularly produced for pipe sizing. The material has been used for tube straightener screws and piercing mill bar heads.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*



Unretouched photograph shows mirrorlike interior finish of Lustraloy seamless tubing compared with rod drawn tubing

Tubing Has Mirror Interior

Process for producing the stainless material includes cold reduction, bright annealing, careful lubricating, and drawing over a mandrel and through a die

SEAMLESS stainless tubing with a mirrorlike interior finish is being produced by a new mandrel drawing process.

Called Lustraloy, it offers a freer flow and a higher degree of corrosion resistance than ordinary rod drawn tubing, says Summerill Stainless Tube Div. of Columbia Steel & Shafting Co., Carnegie, Pa., the producer.

Applications—Interior finish of tubing is important to fabricators of heat exchangers, condensers, chemical apparatus, paper mills, aircraft hydraulic systems, and equipment for the atomic energy industry.

Because the smooth interior resists the clinging of solid particles, the material can be used to advantage where a high degree of sanitation is required, as in the food industry.

Process—The process starts with cold reduction on a tube reducing machine. The tubing is then put through a bright annealing furnace. Control of atmosphere in the furnace and cooling area is an important step in insuring the smooth interior surface.

Since the material will be worked both inside and out on the draw bench, it is carefully lubricated. Drawing through a die and over a mandrel at the same time finishes both the interior and exterior walls.

The size range is $\frac{3}{8}$ to $1\frac{1}{2}$ in. OD, with 0.020 to 0.109 in. wall thicknesses. The tubing is produced at Summerill's new plant at Scottdale, Pa.

View through door of a press forge furnace showing B&W Insulating Firebrick walls and arches and B&W 80 Firebrick floor. The burners and flues are visible on the back wall.

B&W Insulating Firebrick reduce fuel costs 15% and increase production

Experience paid off for this major steel producer. Aware of the benefits of B&W Insulating Firebrick in his drop forge furnaces, he built two new press forge furnaces with lightweight B&W IFB linings. The results were a minimum average fuel saving of 15% *and* increased production, since the entire heating process for certain grades of steel could now be accomplished in one operation. Here's why.

The lightweight and consequent low heat storage of B&W IFB linings keep the furnace walls at a uniform temperature to provide the most efficient heating conditions. Unlike heavier constructions, B&W Insulating Firebrick linings attain a uniform temperature faster with less fuel consumption.

In addition, B&W IFB linings respond quicker to temperature changes, permitting more accurate temperature control. In this instance, this not only prevented the cracking of tool and stainless steels, but helped reduce the total heating cycle, increasing production.

These forging furnaces use a 9" B&W K-30 IFB wall backed up by B&W K-20 IFB. The K-30 is used as face brick because of its high temperature resistance. The K-20 is used as a backing because of its high insulating value. The hearth floor is of B&W 80 Firebrick for abrasion resistance and resistance against attack by mill-scale at the temperatures involved. Door linings are of B&W Kaocast and B&W Kaolite.

R-583

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics, and Mortars • B&W Silicon Carbide • B&W Ramming Mixes

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Model 713, 300-ton multiple motion press has three lower punch motions, proportional pressing for the compression strokes on the lower punches, and two upper punch motions

Compacts Have Even Density

Stokes's new, 300-ton, hydraulic compacting press achieves uniform density throughout a metal powder part by proportional pressing. Fill adjustments are motor driven

"TECHNICAL advances in powder metallurgy procedures and equipment make it possible to produce large, complex parts with superior functional qualities at costs competitive with those produced by machining or other methods."

That commentary, spoken by Samuel H. Greenwood, manager of the Press Div., F. J. Stokes Corp., Philadelphia, shows the amazing progress of an industry that only a few years ago was primarily concerned with small bearings.

Today, metal powder partmakers are producing heavily stressed gears, cams, and other moving parts such as those used in auto transmissions, washing machine drives, and other powered appliances.

Equipment Innovations—It takes powerful presses with sequence controlled multiple motions to compact those parts. The newest such unit is a 300-ton hydraulic press, built by F. J. Stokes Corp. It is being readied for delivery to the Powdered Metal Products Div. of Yale & Towne Mfg. Co., Franklin Park, Ill. (It is the first of a line of five presses, with capacities of 50 to 500 tons.)

Two major design innovations have these advantages: 1. The press is easier and quicker to set up to make a part. 2. The press can achieve a higher degree of uniformity in density and greater accuracy in dimensions.

Proportional Pressing—The main pressing motion in the Model 713 press is from the bottom. The inner and outer bottom punches are fixed to separate moving platens, but there are only two hydraulic cylinders for both platens. The pistons that actuate the inner and outer punches work in the same cylinder.

Through this design, it is possible to start the two punches in their upward compression strokes at different levels, move at different rates, and arrive simultaneously at their final, full-compression level. Stokes calls it "proportional pressing."

A potentiometer controlled, hydraulic servomechanism senses the movements of the platens which carry the two lower punches and makes them follow a predetermined relative-movement pattern. The pattern is calculated according to the shape of the part, the nature of the metal powder, and the density required in the final compact.

Mechanized Adjustment — The second innovation is a motor-driven adjustment of the mechanical stops that control the depth of fill and the length of the compression strokes for both upper and lower punches and for the ejection strokes of the lower punches.

The location of each stop with respect to a reference point—the upper surface of the die table—is reported on a series of five-digit counters on the control panel. Each counter is beside the push-button control for the air motor that drives that particular stop.

Simplifies Re-Setup — Two-speed control is provided for each motor

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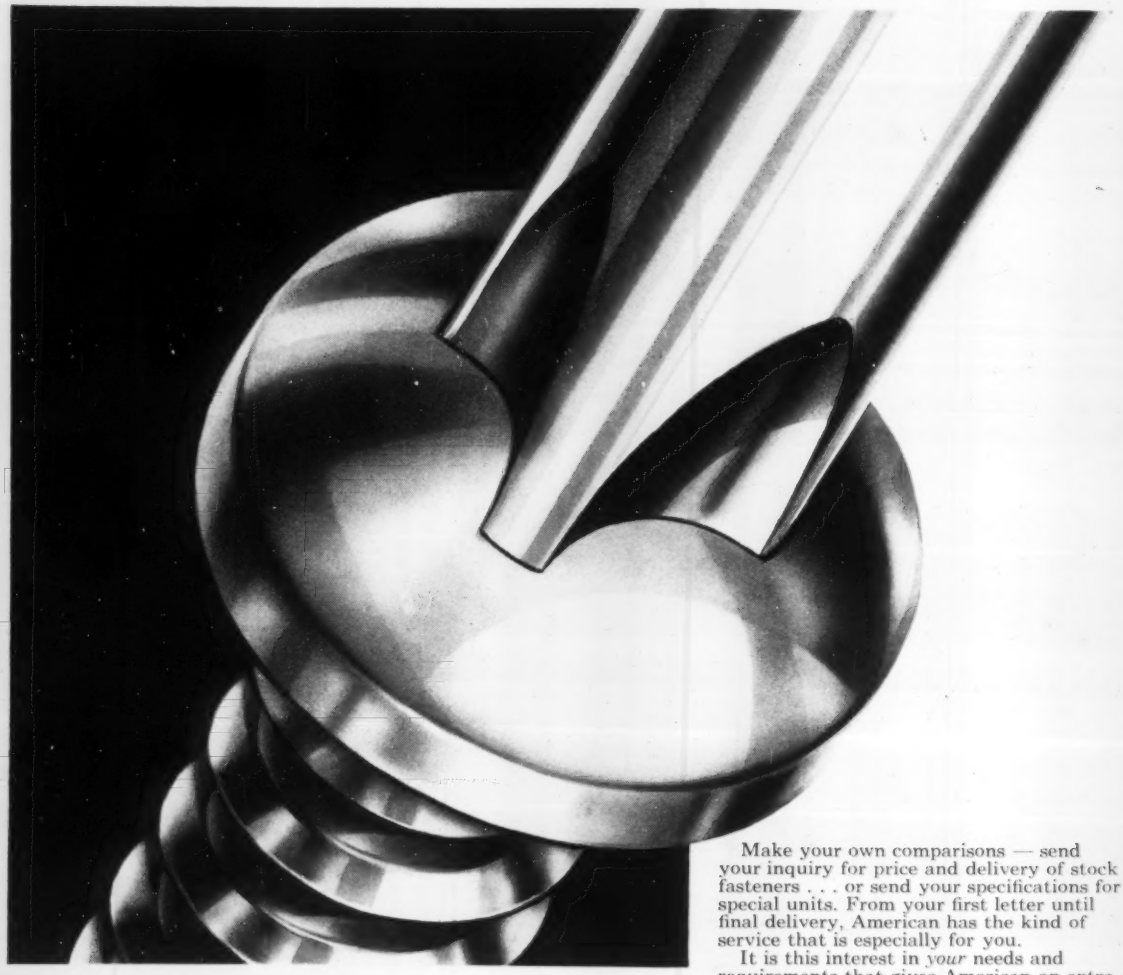

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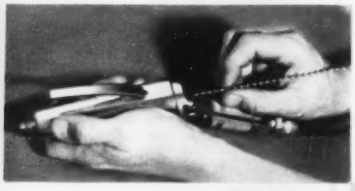
SCREWSTICK, another American development, enables power driving to replace individual handling of hard-to-manage small screws with a cost saving of 4 to 1.



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—a fast speed for large changes in the position of the stop and a slow speed for jogging the stop the last few ten-thousandths of an inch to the exact position.

By recording the setting of the stops when the final setup for a part has been determined, the operator can re-create the same setup when the part is again placed in production merely by duplicating the previous dial settings.

Other Features—The Model 713 has five motions, two upper and three lower. The second upper punch is carried concentrically on the main upper hydraulic ram but has independent adjustment.

During final compression, both the main and secondary upper punches come to rest against adjustable mechanical stops, at which point they are carried downward together by the upper ram platen. A knock-out arrangement is provided for stripping parts with double hubs from the upper punches.

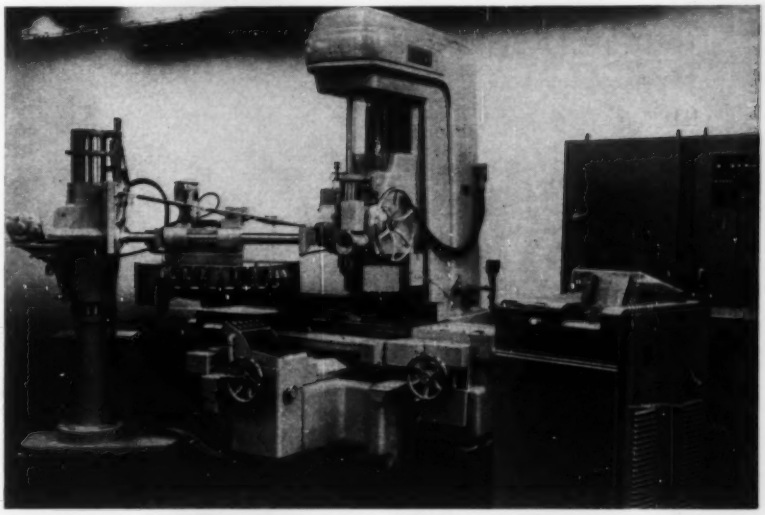
Simultaneous Ejection — The lower inner punch moves at the same time and rate as the lower outer punch during ejection until the leading punch rises to a position level with the face of the die. That feature permits ejection of thin-flanged parts without fracturing the "green" compact.

The third lower punch motion may be used as a third compression punch, a movable core rod, or an ejecting core rod. The function for which this motion is used can be selected by a switch at the control panel.

Specifications — Maximum pressure on the upper punch ram of the press is 321 tons; on the lower punch platens, 300 tons. Maximum depth of fill is 10 in.; maximum diameter of a part is 12 in. At maximum fill, the press will cycle four times a minute; at a 1-in. fill, it will cycle 10 times a minute.

Over-all height of the press is 17 ft 8 in.; about 4 ft of the press is below the floor line.

The hydraulic power unit is self-contained and consists of a 150 hp, double end electric motor driving two, 44.5-gpm hydraulic pumps. This allows the press and its power unit to be installed in an arrangement that makes the most efficient use of floor space.



Disc at left is a reservoir that stores tools, changes them automatically

Jig Borer Picks Its Tools

Complete cycle, including 30 operations, is controlled by punched cards. Position of holes, feed depth, and spindle speeds and feeds all are automatically selected

JIG BORING, an operation that usually depends heavily on the skill of an operator, has gone fully automatic. Production men at IBM's Mfg. Research Dept., Endicott, N. Y., are using a numerically controlled jig borer to turn out side frames for data processing equipment.

Machine functions controlled with IBM cards include: Choice of 30 or more tools, positioning of holes, spindle speeds and feeds, hole depth, and spindle height. The machine was built at Fosdick Machine Tool Co., Cincinnati.

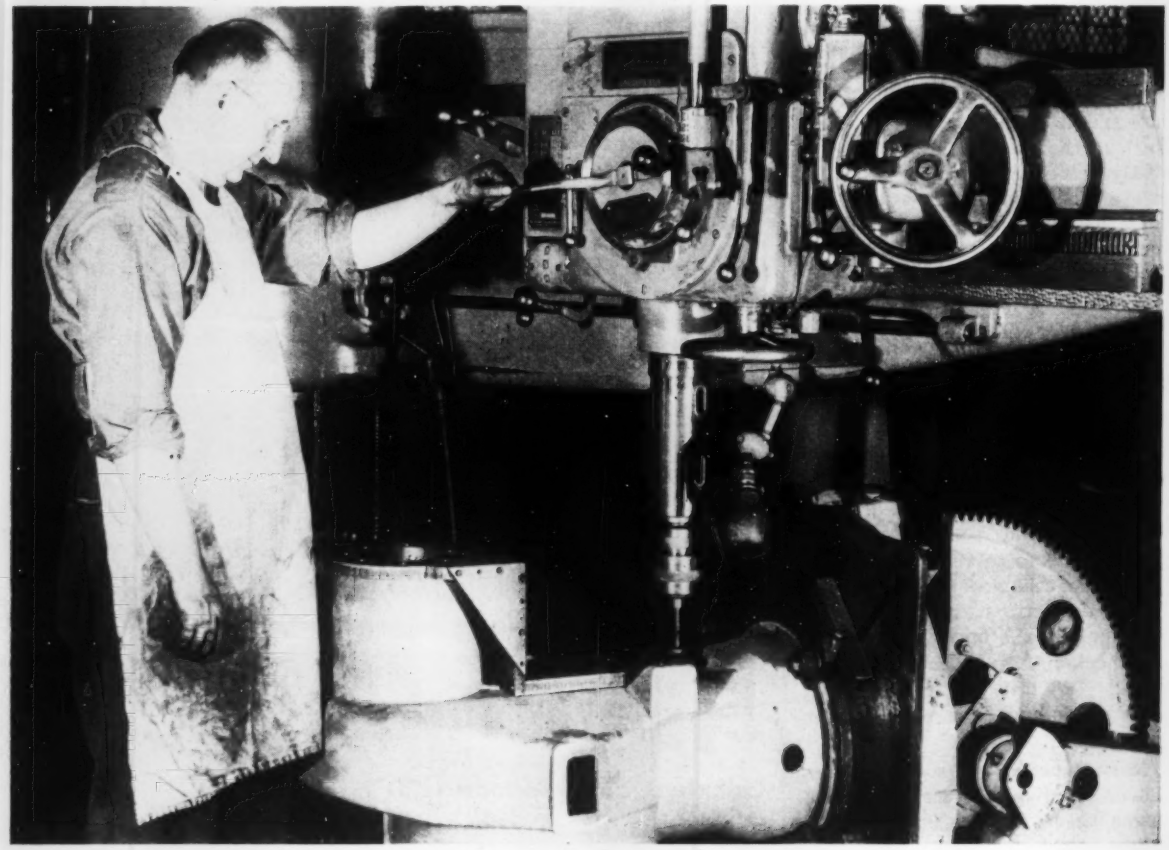
Tool Choice — The tool storage unit is mounted on the floor, separate from the machine. Tools are carried in a disc that indexes to a preselected position under card control. This unit slides on horizontal tierods so tools may be positioned under the spindle.

The disc rotates to the specified position. It then moves in under the spindle where an air-operated wrench closes on the toolholder. After the disc is retracted, the spindle feeds down, rotating slowly, and engages the thread at the end of the toolholder shank. At a predetermined locking torque, the wrench opens, and the spindle feeds down in accordance with the program. Removing the tool is done by the same steps in reverse.

Hole Depth—In devising a method to control hole depth automatically, IBM took advantage of the fact that a workpiece mounted on a machine is subjected to two vibration sources. The first comes from the machine. The second occurs when a cutting tool enters the work (it can be recognized by a piezoelectric crystal mounted on the work-holding fixture).

After the tool enters the work, depth measurements are controlled by a shaft digitizer geared to the feed drive; pulses are obtained for each 0.001 in. of feed.

Rapid traverse of the spindle is controlled by a photoelectric unit. As the tool feeds down, it passes through a beam of light. From this point, it continues to traverse a predetermined distance where it shifts into cutting feed rate.



Machine shops find welding positioners are timesavers. This pump casting is moved quickly and easily under radial drill

More Work for Welding Positioners

WELDING positioners can handle many nonwelding jobs.

Paul Galton, department manager, Worthington Corp., Harrison, N. J., has these suggestions:

1. Use them to position heavy objects for an operator.

2. Use them to rotate parts or assemblies for spraying, cleaning, descaling, grinding.

3. Use them in assembling and servicing engines, motors, turbines.

4. Use them for positioning during x-ray inspection.

Examples—Positioners solve the problem of manipulating a cumbersome object without the use of overhead lifting devices.

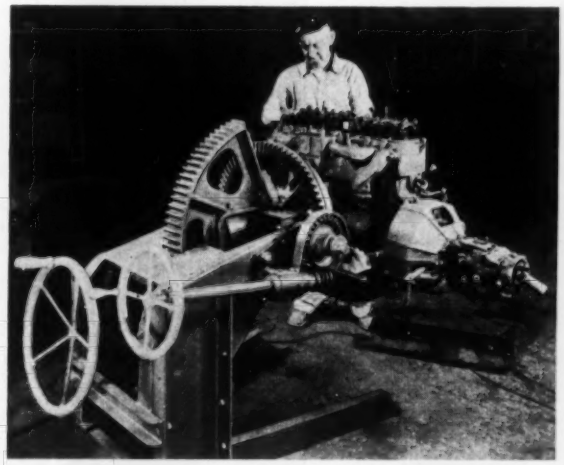
If the work can be rotated or tilted, a positioner is a timesaver. Machine shops use them for drilling and cutting.

Worthington's shops use them for quick positioning of castings beneath a radial drill (see illustration above). Standard positioners, says Worthington, may require beefing up to control shock loads and vibration and to increase resistance to torque.

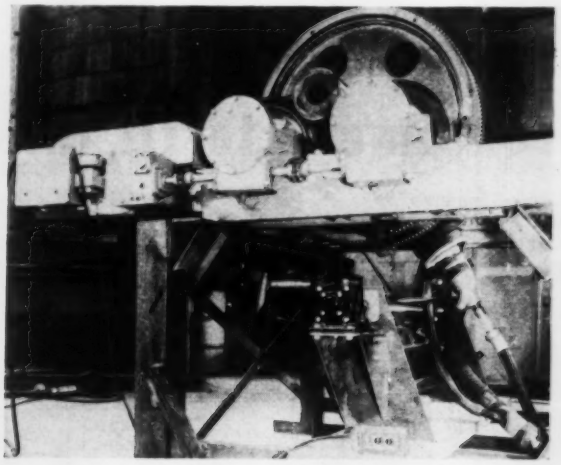
Examples—General Electric Co., Schenectady, N. Y., says that positioners help in inspection and repair. It uses them to rotate large vessels or weldments for x-ray. With portable x-rays, a positioner cuts setup time and helps an operator work in one location.

Self-propelled positioners are frequently used with stationary x-ray units or in x-ray rooms.

Examples—Such equipment helps in mechanizing heat treating, metallizing, scarfing, or gas cutting. RCA, Lancaster, Pa., uses positioners in the high speed aluminizing of color TV tubes. The Atomic Energy Commission finds them useful for automatic loading and unloading of nuclear materials.

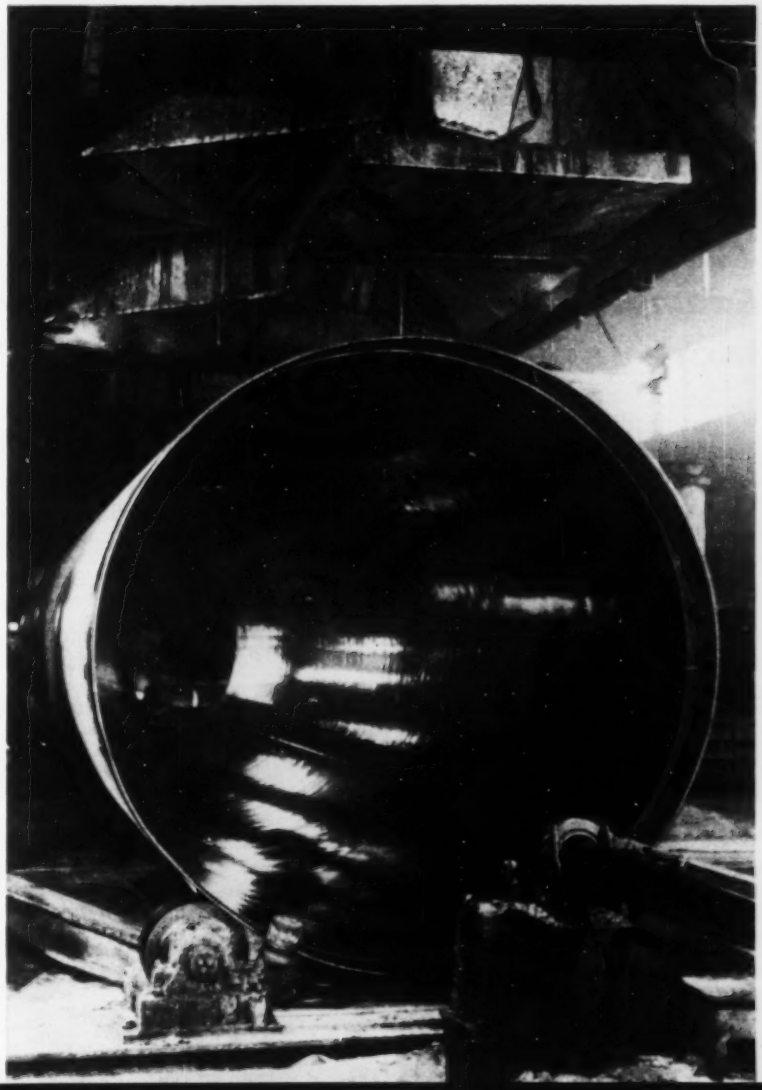


This mechanic will do better work in less time with the help of this hand-operated positioner. It helps eliminate the hard-to-reach places



Shot peening large gears at Westinghouse Electric Corp., Sunnyvale, Calif. Rolls turn gear on shaft. Shot peener is at lower right

Turning rolls are one type of positioner. This installation is used for enamel coating the interiors of large diameter pipe

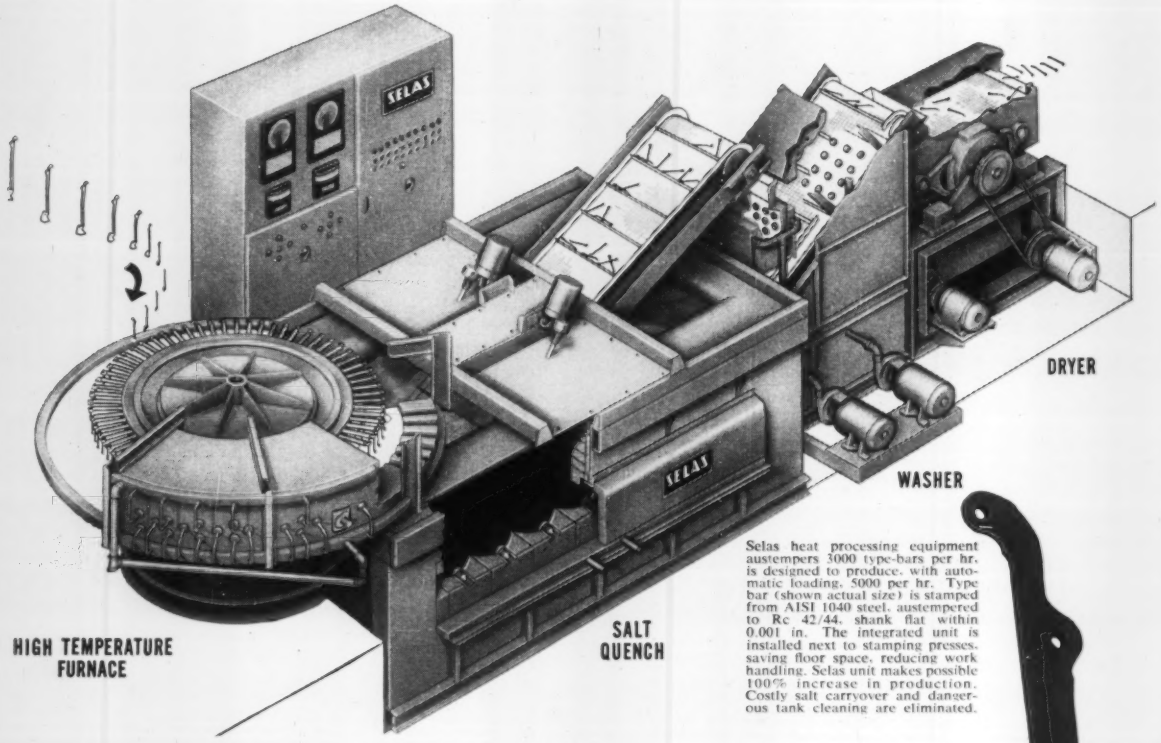


They aid machinists, foundrymen, assemblers, painters and inspectors. Here are some suggestions on how you can add versatility to these tools in your operations

Examples—Turning rolls are one type of positioner which can be used for most kinds of finishing work. A Pennsylvania steel company has one which rotates large diameter steel pipes at speeds up to 600 fpm. It applies an enamel (Bitumastic) to the interior with an automatic spraying.

Westinghouse Electric Corp., Sunnyvale, Calif., has adapted a power and an idler roll to rotate a large gear for shot peening. The gear is mounted on a shaft which rests on the rolls. As the gear is turned the shot peening equipment traverses the gear face.

Selas custom-builds heat processing equipment to fit into your production line



Selas heat processing equipment austempers 3000 type-bars per hr. is designed to produce, with automatic loading, 5000 per hr. Type bar (shown actual size) is stamped from AISI 1040 steel, austempered to Rc 42/44, shank flat within 0.001 in. The integrated unit is installed next to stamping presses, saving floor space, reducing work handling. Selas unit makes possible 100% increase in production. Costly salt carryover and dangerous tank cleaning are eliminated.

Example: automatic austempering increases IBM type bar production 100%

For more than a year, this Selas custom-built heat-treating equipment has been turning out a better product, saving valuable floor space, reducing materials handling.

Based on satisfactory experience with this equipment, a second similar Selas unit, austempering another electric typewriter component, is scheduled to go into production at IBM this month.

Time-saving, space-saving, materials-saving heat processing equipment is designed and built by Selas to meet your specific needs. If desired, the complete Selas unit may be shipped intact to your plant, ready for insertion into your production line . . . ready, too, to perform its designated heat processing functions immediately upon hook-up to power.

For any type of heat processing, for small or large parts, Selas can design and build automatic or semi-automatic equipment to fit into your production line. To learn how Selas can help you solve your heat processing problems, write Department 213, Selas Corporation of America, Dresher, Pa.

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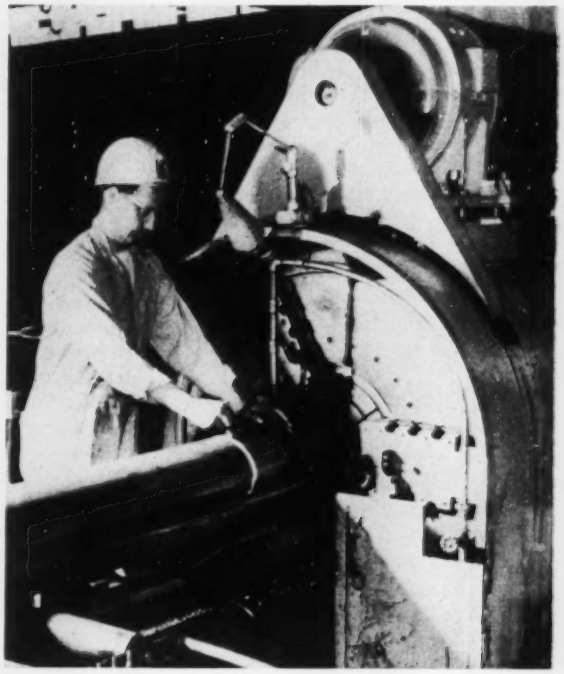
Heat and Fluid Processing Engineers

DEVELOPMENT • DESIGN • CONSTRUCTION

Hydraulic Machine Crops Steel Pipes in 13 Seconds



Model 1200 HC cuts steel pipe with a $\frac{3}{8}$-in. wall and an outside diameter of $12\frac{3}{4}$ in. in 13 seconds.

Both the head of the machine and the workpiece remain stationary; it is the cutoff tools that rotate. The machine is used to crop sample pipe lengths for testing to API specifications.

Tooling consists of three turrets which hold 12 carbide tipped cutting tools.

Three tools do the cutting; the idle stations are for quick tool changes.

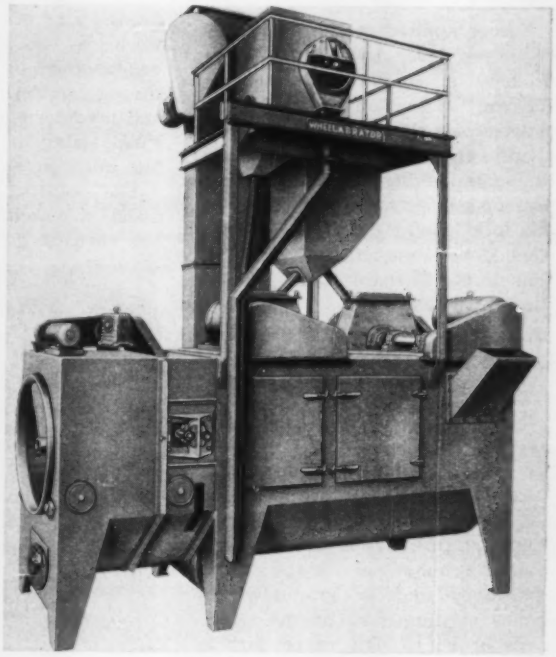
Tool stroke is $1\frac{1}{2}$ in. for pipe with $1\frac{1}{4}$-in. walls. Feeds and speeds are easily adjusted by turning a dial on a hydraulic metering valve.

A collet grips the workpiece during the cutting operation. The collet is mounted in a spindle which in turn is mounted on tapered roller bearings. The spindle is driven by a 25-hp direct current motor through V-belts.

The control panel pulpit includes a pushbutton control for an entire assembly area in which the pipe is automatically fed (by conveyor) to the machine and measured electronically.

A hydraulic system operates the machine. Valves and pumps are mounted on panels to make maintenance easier. The gasket-mounted valves can be removed without disconnecting any hydraulic lines. *Write*: Abbey Etna Machine Co., Perrysburg, Ohio.

Blast Tumbling Machine Handles Continuous Flow of Work



The Continuous Tumblast cleans parts automatically. Work enters the machine from one end and goes directly into the cleaning chamber. It then passes down an inclined chute into the discharge drum and from there into a tote box or conveyor.

The blast chamber is an endless apron conveyor 26 in. in diameter. The chamber is unobstructed because the two overhead blasting units are above the full diameter of the tumbling mill.

The combination of tumbling and longitudinal travel uniformly exposes all surfaces of every part to the abrasive blast.

Conveyor staves extend the full length of the mill to eliminate the possibility of the work or the abrasive jamming in the joints.

After the cleaned work passes beyond the blast zone, it enters into a discharge drum which tumbles the parts to remove the abrasive held in cavities or recesses of the work.

A variable speed reducer allows rotation of the discharge drum at the speed most suitable for the type and size of work. The abrasive drains through perforations in the drum slats and falls into a screw conveyor which carries it to the abrasive elevator. *Write*: Wheelabrator Corp., 1157 S. Byrkit St., Mishawaka, Ind. *Phone*: Blackburn 5-2141

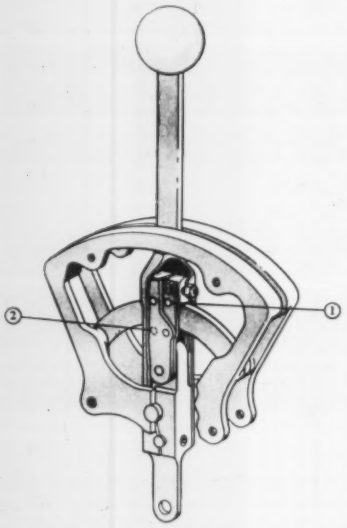
NEW PRODUCTS and equipment

Control Lock

This shear-action locking device holds control settings and eliminates backlash and creep.

The locking action is automatic at an infinite number of settings.

The control has three prime elements, two locking shoes (one for each direction) and a quadrant. Two self-aligning shoe pins (1 and 2 in the illustration) are on opposite sides of the common center and engage the underside and outside of the quadrant.



Forces applied at the secondary or driven lever toward the right produce a couple and increase shearing action on the quadrant between the shoe pins. Forces applied in the opposite direction have the same locking action on the opposite shoe, providing an irreversible lock in both directions. *Write*: Reid Metal Products Inc., 2021 N. Lincoln St., Burbank, Calif. *Phone*: Victoria 9-1284

Lathes

The Powershift Preselector lathes come in engine, toolmaker, and gap models and in 45 and 90 degree tracer controlled types.

The operator can preselect his next speed while the tool is cutting. The headstock has a single dial. The inner part of the dial is stationary and is graduated in inches of diameter (of the workpiece or cut). The outer part is

graduated in feet per minute, surface speed. Setting one against the other instantly computes spindle rpm. The figure is shown in a small window together with maximum safe horsepower.

After the selection is made, automatic shifting of gears is controlled by the operator. One lever stops, starts, and shifts. Up to six additional speeds can be set on the dial. *Write*: Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio. *Phone*: Kirby 1-4774

Thread Rolling Machine

This horizontal, cylindrical machine uses two dies. Model B 111 is used for both in-feed and through-feed thread and form rolling on large and small production runs.

During rolling, one die remains fixed. The other is fed into the work by a cam-actuated head which controls the feed and size through uniform penetration rates and predetermined length of dwell. Final sizing is accurately done by fine micrometer adjustment.

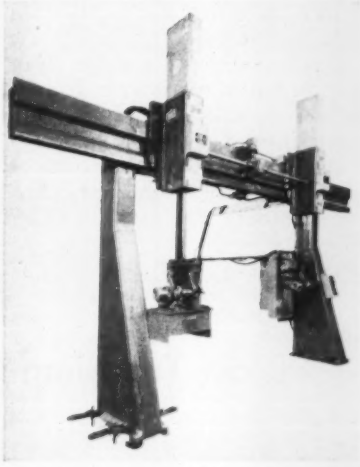
The rotating dies are synchronized: a matching device positions the threads on the die in proper

relation to each other so that they track properly when contacting the blank.

Parts 2 in. in diameter can be handled by the in-feed method. These thread lengths can be up to 1⅞ in. Thread length up to 20 ft can be rolled by the through-feed method; maximum diameter is ¾ in. *Write*: Reed Rolled Thread Die Co., P.O. Box 350, Worcester 1, Mass. *Phone*: Valley 9-4491

Grinder Automation

This automatic loading and unloading device automates standard grinders. The unit straddles the grinder being serviced. It loads and unloads from both sides of the grinder.



Each loading station lowers to pick up the work, raises, and transfers it across and down into the work area. Cycle time is about 15 seconds. *Write*: Machine Tool Div., Wickes Corp., Saginaw, Mich. *Phone*: Pleasant 2-6126

Wire Weaving Machine

This machine uses a series of 1-ounce steel shuttles which draw from a continuous supply of filler wire (instead of the conventional bar-loom type bobbin system) to make insect screening up to 50 in. wide. Speeds are said to be four to six times higher than those of conventional equipment.

The machine operates at 240 picks a minute. Shuttles, with filler wire attached, are propelled through a tunnel of guides on the machine by a torsion rod mecha-

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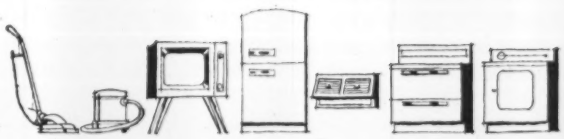

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NEW PRODUCTS and equipment

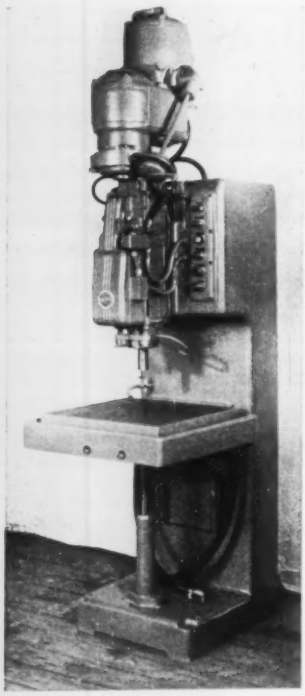
nism. When the filler wire reaches the opposite end of the cloth, it is cut and the end tucked back into the edge to form the selvage.

Running time is 2 to 3 hours, depending upon cloth width. Up to 12,000 ft of 0.013-in. aluminum wire can be held by the machine's warp beam. *Write*: Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio. *Phone*: Henderson 1-5580

Drill Press

High speed drilling and tapping are done by this automatic cycle drill press. Its quill has quick approach, feed, and dwell speeds.

Turning a handwheel gives infinite adjustment of speeds up to 8000 rpm. Feed adjustment is infinitely variable up to 48 ipm.



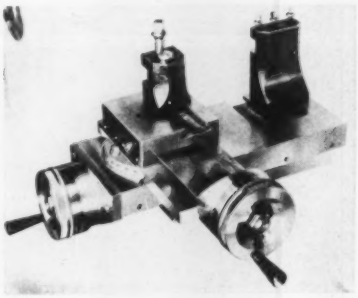
Feed strokes up to 4½ in. are provided.

A 2-hp motor drives the machine. *Write*: Secrest Machine Co., 1507 M St. N. W., Washington 5, D. C. *Phone*: Columbia 5-6696

Slide Rest

The Super Slide Rest combines the features of a conventional slide rest with a center-driven tool post slide and an open slide tool post.

The swivel slide is graduated in degrees and may be swung and used for turning operations, with no interference between handles or slides.



The top slide travel is 4½ in. Tool bit size is ⅜ x ⅜ in.

A rear tool station and tool post make turning and cutting off, or any other two operations, possible without disturbing the setup. *Write*: Wade Tool Co., 49 River St., Waltham 54, Mass. *Phone*: Twinbrook 4-1050

Titanium Pipe Fittings

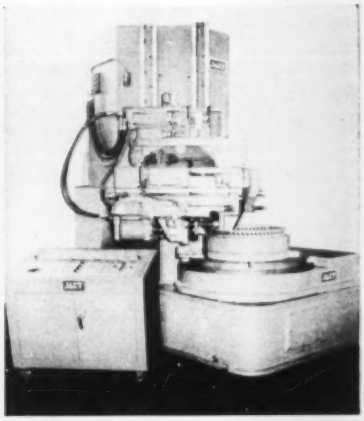
This line of fittings meets the needs of nuclear piping systems and critical service applications in chemical processing industries.

The fittings are light, resist corrosion and erosion, and have high stability at elevated temperatures. *Write*: Ladish Co., Cudahy, Wis. *Phone*: Humboldt 1-1500

Index and Pierce Machine

Annular rings from 16 to 54 in. in diameter are perforated or formed by this machine. It is a precision machine tool with hardened and ground cross keys and stop blocks for accurate repetitive positioning of dies to ten-thousandths of an inch.

The index table features infinite



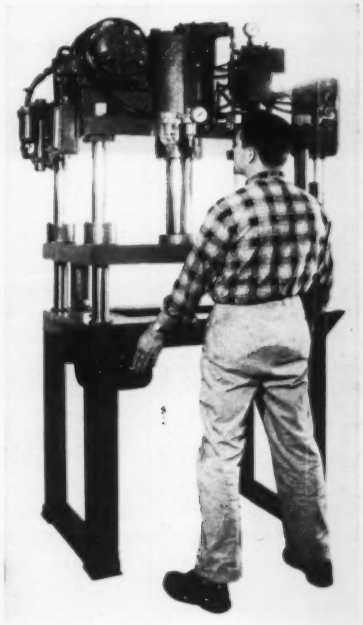
resolution from 1 to 21,600 divisions of a circle. The table has automatic and manual control. The mechanical lock has zero backlash.

A block indexing control compensates for part size change due to fabrication or thermal conditions. *Write*: Modern Engineering Service Co., 1695 12 Mile Rd., Berkley, Mich. *Phone*: Lincoln 5-1700

Trim Presses

These hydraulic presses have platen sizes from 15 x 18 up to 36 x 54 in. Strokes of 12, 15, and 18 in. and shut heights of 5, 10, and 15 in. are available in 13, 20, 30, 40, and 50 ton capacities. Two and four post types are available.

The presses use an accumulator



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For more information write ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

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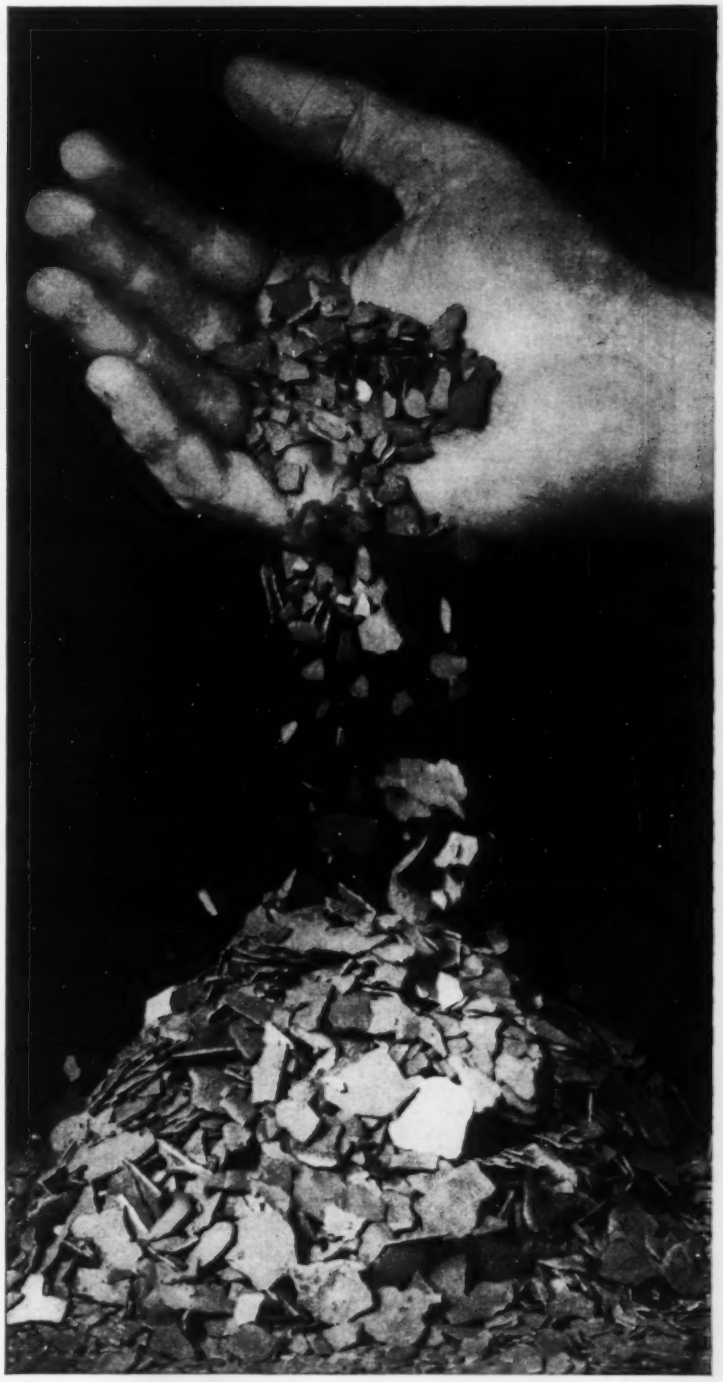


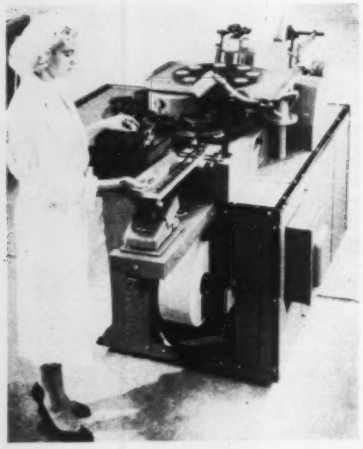
Analysis: Vanadium Oxide 98%, Alkali Oxides 1-2%, Sulfur 0.05% Max., Insolubles 0.2% Max.

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

with a closed shock-free hydraulic system. Typical operations include trimming, swaging, stamping, shearing, blanking, forming, and drawing. *Write*: Bausenbach Hydraulics Div., Buffalo Metal Container Corp., 75 Meadow Rd., Buffalo 16, N. Y. *Phone*: Bailey 3944

Parts Packager

The Pax-Mor is a complete packaging machine that automatically prints, seals, cuts off and counts packages. Maximum size is 8 x 8 in.



Small mechanical parts can be packed individually or in multiples at speeds up to 6000 bags an hour. Coated or laminated heat sealable packaging materials can be used.

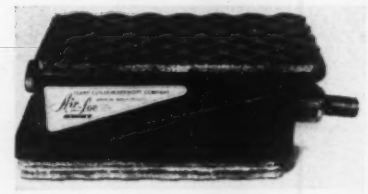
An electronic thermistor holds temperatures to $\pm 1°$ F on heat sealing rollers. *Write*: Product Packaging Engineering, 5747 Marilyn Ave., Culver City, Calif.

Machinery Mount

Wedgemount absorbs vibrations and permits instant leveling. Adjusting a nut causes movement between two opposing inclined planes which raises or lowers the machine foot under which the mount has been placed.

A patented vibration absorbing pad made of vinyl, sisal, and cork is used for top and bottom surfaces of the mount.

When installed under machines, the mounts on either side are faced in opposite directions. This



cradles the machine in opposing planes. Both halves of the mount are machined and keyed to permit vertical adjustment without lateral motion.

There are three sizes: 2 x 4 in. supports up to 1000 lb; 3 x 6 in., 2000 lb; and 4 x 8 in., 4000 lb. *Write*: Clark, Cutler, McDermott Co., 130 W. Central St., Franklin, Mass. *Phone*: 1200

Vibrating Feeder

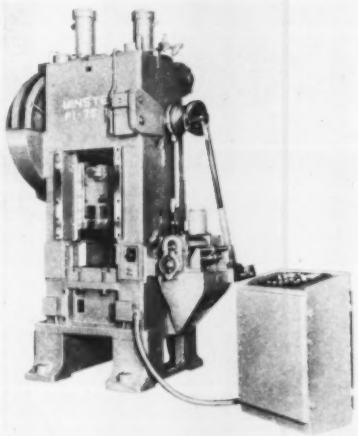
Ore and other bulk materials in lump sizes up to 4 ft in diameter are moved at the rate of 300 to 3000 tons an hour by this heavy-duty feeder.

It is used where difficult conditions are encountered, such as large lumps and heavy impact loading, severe abrasion, unusually sticky material, or heavy surge loads. *Write*: Hewitt-Robins Inc., Stamford, Conn. *Phone*: Davis 4-1151

Single Point Presses

The P-1 Piece-Maker presses in 75, 100, and 150 ton capacities are suited for progressive die blanking and perforating operations that involve heavy shock loads. Fixed or variable speed drives are available.

The single point box-type slide maintains the slide to bed parallelism needed for automatic production. All wear points of the

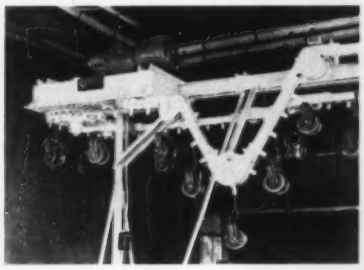


box-type frame are lined with nickel bronze. *Write*: Minster Machine Co., Minster, Ohio. *Phone*: 194

Overhead Chain Conveyor

The Vernoflex chain conveyor can be installed with hand tools. It can be altered by adding or subtracting the necessary parts to meet changing plant needs.

Abrupt horizontal and vertical turns are possible, including 90-degree vertical rises and dips and 2-in. radius turns.



All moving parts are enclosed, and the chain is lubricated automatically.

The conveyor handles parts in assembly, paint dipping, oven or infrared drying, spraying, scaling, rinsing, and through caustic and pickling solutions. *Write*: Vern G. Ellen Co., 2741 Ripple Lane, Minneapolis 27, Minn. *Phone*: Liberty 5-8847

Thread Rolling

Model 125A forms screws, bolts, and nails at speeds of 600 to 800 pieces a minute.

The machine does thread rolling, roll forming, knurling, marking, serrating, and necking on blank stock lengths up to 3 in. and diameters from No. 4 to 5/16 in. *Write*: Prutton Corp., 5293 W. 130th St., Cleveland 30, Ohio. *Phone*: Clearwater 1-5384

Air Filter

Hot, corrosive industrial dusts and fumes are collected by this glass-bag filter.

By using glass cloth, the filter can withstand temperatures up to 600° F. It resists all substances except fluorine and hydrofluoric acid.

The filter bags are the single-hung tubular type made of glass

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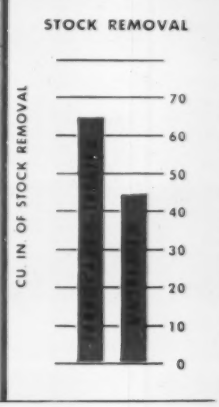
Chemical Analyses	Untreated	Ferrocarbo® Treated
TC	3.51	3.54
Si	1.91	1.82
CE	4.15	4.15
Cutting speed (ft./min.)	300	300
Feed (in. rev.)	.009	.009
Depth of cut (in.)	.062	.062
Wear Land (in.)	.020	.020
Vol. of metal removed (cu. in.)	42.5	63.0
Weight of metal removed (lbs)	10.9	16.2
Percent improvement		48.5%



* Surface Machinability Improvement
Tool wear tests were conducted with a single point "Carboloy" grade 44A tool on castings machined at commercial speeds. Flank wear was measured with a 20 power microscope.

FERROCARBO Briquettes — the patented cupola additive by CARBORUNDUM® — are widely used by foundrymen to produce sound iron castings with exceptional strength, ductility and hardness properties. Tests have demonstrated that FERROCARBO-treated iron has considerably better machining properties than undeoxidized iron due to structure control and freedom from segregation. High production industries seeking to reduce costs are buying castings produced by the FERROCARBO cupola deoxidation process as an effective means for increasing production through improved casting machinability.

WRITE FOR MORE INFORMATION on how FERROCARBO produces more machinable iron regardless of metal composition. Ask for booklet A-1409, Electro Minerals Division, The Carborundum Company, Niagara Falls, N.Y.

ELECTRO MINERALS DIVISION

The CARBORUNDUM Company

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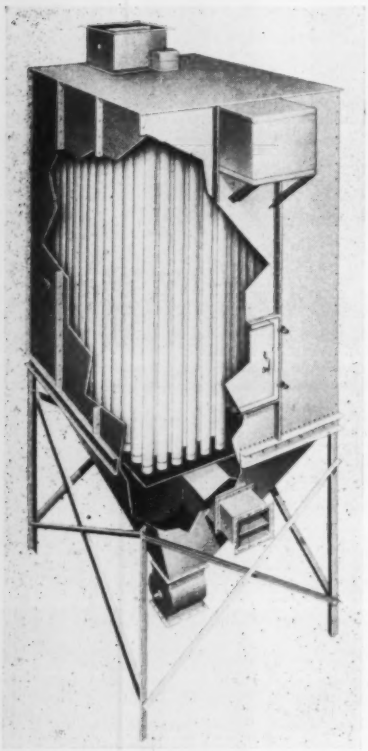
NEW PRODUCTS and equipment



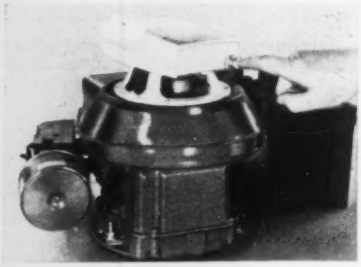
fiber cloth which has been treated for protection against fracture. *Write*: Dracco Corp., 4063 E. 116th St., Cleveland 5, Ohio. *Phone*: Vulcan 3-7000

Electric Starter

Model 850 operates on direct current and provides clockwise rotation. It starts engines with up to 4 hp which have a maximum displacement of about 11 cu in.

The starter brings pushbutton starting (using either an integral or remote switch) to pumps, sprayers, industrial scooters, garden tractors, and riding-type power mowers.

A 12-volt battery powers the starter. *Write*: Magneto Div., Fairbanks, Morse & Co., Beloit, Wis. *Phone*: Emerson 4-4411



Zinc Bath Purifier

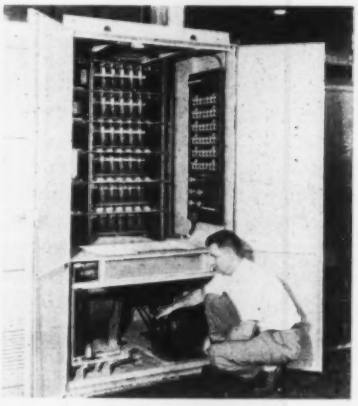
ARP 12 prevents the accumulation of harmful impurities in zinc plating baths. By purifying solutions of heavy metallic elements, the purifier reduces the amount of brighteners needed to provide a bright plate.

The purifier is a concentrated liquid which, when diluted with water and added to the plating bath, performs two functions: 1. It precipitates heavy metallic impurities (including lead and cadmium) which can cause dullness and blistering in zinc plate. 2. It removes carbonates at about the same rate at which they are formed.

Concentrations of the purifier are determined by the use of sulfide test papers. *Write*: Allied Research Products Inc., 4004-6 E. Monument St., Baltimore 5, Md. *Phone*: Peabody 2-9070

Germanium Rectifiers

These rectifiers are used in the steel and electrochemical industries where steady loads require a potential below 300 volts. The air-to-water cooling system of the rectifiers eliminates the entrance of dust and corrosive air into the rectifier compartment. Rectifier elements are easily replaced because there are no liquid connections to make.



Because the unit is enclosed, the rectifier elements are not sensitive to external ambient temperatures. *Write*: Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. *Phone*: Spring 4-3600

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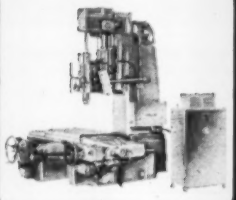
JIG BORER



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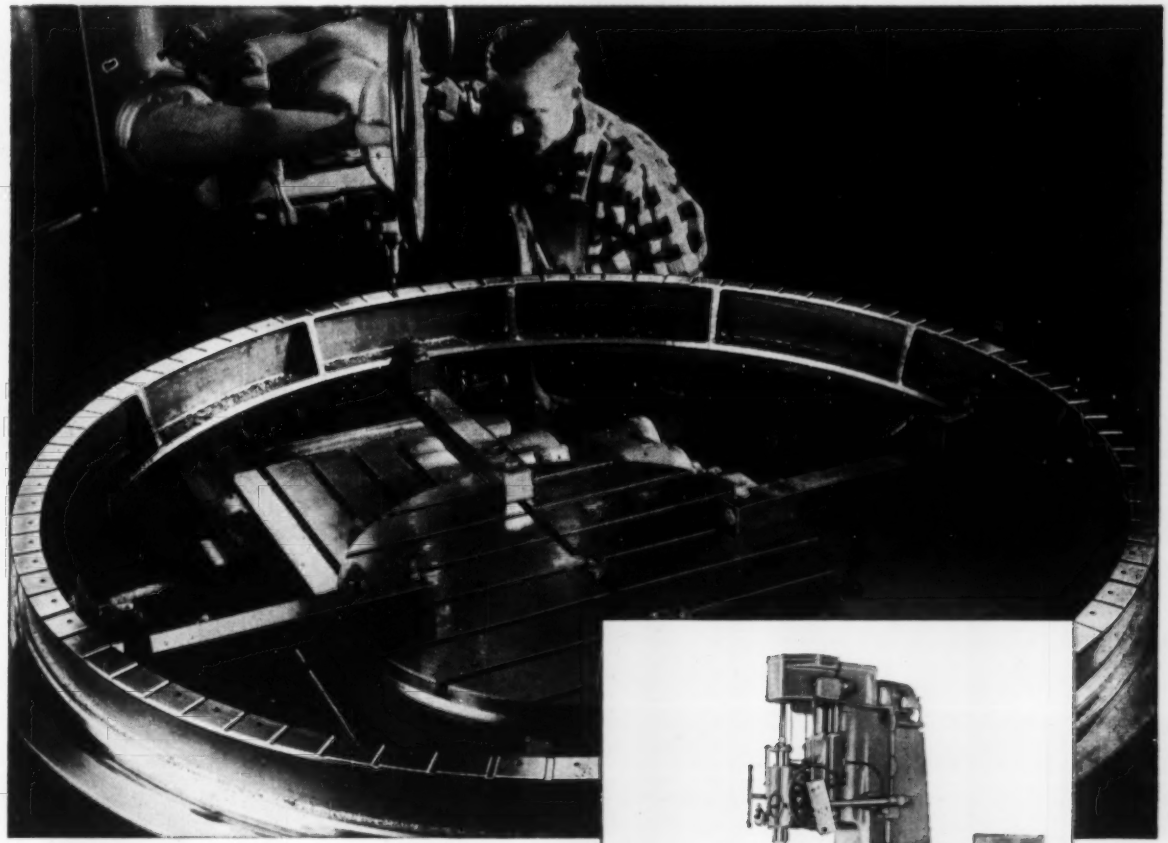

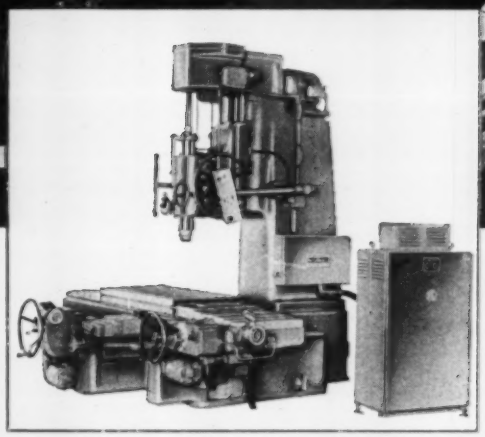

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NEW literature

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Disc Mounting Standards

Bulletin B5.35 presents machine mounting specifications for abrasive discs and plate mounted wheels. Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15, Ohio.

Automatic Presses

Bulletin 264, 24 pages, describes two-point, straight side presses (capacities from 60 to 300 tons) which have automatic coil feed. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y.

Hydraulic Fluids

The selection, operation, and maintenance of petroleum base and fire resistant hydraulic fluids are discussed in Bulletin 1300SA, 22 pages. Advertising Dept., Vickers Inc., Box 302, Detroit 32, Mich.

Metal Stitching

This 16-page bulletin illustrates and gives detailed information on stitching metal to metal and metal to nonmetallic materials. Acme Steel Co., 135th Street and Perry Avenue, Chicago 27, Ill.

Potentiometer

A portable unit that measures temperatures from −200 to 600° F and voltages up to 20.1 millivolts is described in Bulletin T-57, 6 pages. Technique Associates Inc., P. O. Box 91, Indianapolis 6, Ind.

Framing Material

Slotted angles for making permanent or temporary jobs and casters that can be used with them are covered in this 8-page bulletin. Flex-Angle Corp., 278 Park Rd., West Hartford 7, Conn.

Bottom Drive Presses

Specifications of single, double, and triple action presses and descriptions of the various types of accelerated slide motions are included in Bulletin 235, 32 pages. Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.

Totally Protected Motors

Alternating current motors from 1 to 125 hp are covered in Bulletin B-2506, 4 pages. Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio.

Overhead Handling

Equipment for adapting monorails to a variety of installations is depicted in this 8-page bulletin. American Monorail Co., 13128 Athens Ave., Cleveland 7, Ohio.

Tungsten Carbide Surfacing

Protection against wear and abrasion provided by small hexagonal buttons assembled on a flexible backing material for bonding on metal surfaces is described in this 4-page bulletin. Kennametal Inc., Latrobe, Pa.

Seamless Tubing

Bulletin 290, 5 pages, details high temperature strength properties of 16-13-3 seamless tubing. Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

Thermal Elements

Bulletin 110, 4 pages, lists thermal elements for maximum resistance to corrosive atmospheres. More than 400 separate corrosive atmospheres are covered. Partlow Corp., 505 Campion Rd., New Hartford, N. Y.

Wet Blasting

Bulletin 1403 describes how wet blasting machines solve production and maintenance problems. Pangborn Corp., Hagerstown, Md.

Flue Gas Analysis

A magnetic O_2 system and its installation are covered in this 4-page bulletin, 463-60. Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.

Steel Castings

Physical strengths and chemical analysis of steel casting alloys melted in the induction furnace are listed in this 6-page bulletin. Induction Steel Castings Co. Inc., 18021 E. Nine Mile Rd., East Detroit, Mich.

Heat Treating

Features of units that provide temperatures up to 2400° F are covered in this 4-page bulletin. Ipsen Industries Inc., 721 S. Main St., Rockford, Ill.

Spiral Point Drills

The spiral point concept in drill point geometry and the drill sharpener used to apply it are described in this 16-page bulletin. Cincinnati Lathe & Tool Co., 3207 Disney St., Cincinnati 9, Ohio.

Hydraulic Presses

This 4-page bulletin describes presses with capacities from 65 to 300 tons. A. Dale Herman Inc., 17071 Ventura Blvd., Encino, Calif.

NEW BOOKS

Boron, Calcium, Columbium, and Zirconium in Iron and Steel, R. A. Grange, F. J. Shortsleeve, D. C. Hilty, W. O. Binder, C. M. Offenhauer, and G. T. Motock, John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. 533 pages, $14.

This is the fourth volume in the Monograph Series of the Alloys of Iron Research Committee of the United Engineering Trustees Inc. The book is a correlated summary of all the important literature on the use of boron, calcium, columbium, and zirconium as alloying metals in carbon steel, simple and complex alloy steels, and cast iron. It will be especially useful to the designer of metals to be used at high temperatures and under high pressures.

Making Management Human, Alfred J. Marrow, McGraw-Hill Book Co., 327 W. 41st St., New York 36, N. Y. 248 pages, $5.

Here are tested methods of applying the findings of psychology to everyday problems of people working together. Neither platitudes nor tricks are presented by the author, who is both president of a manufacturing company and a social psychologist, but a discussion of how principles of industrial psychology can be used.

General Galvanizing: A Manual of Good Practice, Hot Dip Galvanizers Association, 34 Berkeley Square, London W1, England. 56 pages, 25/ ($3.50).

Practical aspects of the galvanizing process are covered in this book. Special attention is paid to the preparation of castings. Full consideration is given to the control of preflux solutions in the dry process. Costs and merits of ammonium chloride and zinc ammonium chloride as fluxes in wet galvanizing are compared. Other sections cover dipping of the work, ash and dross control, handling and treatment after galvanizing, and inspection.

Automation in Practice, S. E. Rusinoff, American Technical Society, 848 E. 58th St., Chicago 37, Ill. 261 pages, $6.50.

The latest techniques of automatic production as they are applied in manufacturing and metalworking are described here. The book discusses basic principles, self-regulation, negative feedback, the theory of closed loop control systems, and covers the use of these principles in the major types of control devices used in automated plants.

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PEAK RELIABILITY. Anaconda's Type ANW-rubber-insulated control cable is a high-quality product which features unusual heat resistance. It is also highly resistant to attack by moisture, acids, alkalies and other chemicals. Individual conductor covering and over-all jacket of neoprene.

MULTIPLE USE. Anaconda thermoplastic control cables can be installed aerially, in conduit, underground in ducts—or buried directly in the earth. They are available with either polyethylene (600 or 1000 volts) or Densheath* vinyl resin (600 volts) insulation and Densheath over-all jacket. Also with Densheath conductor covers on request.

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SIZE	8 x .036
ANALYSIS	1050
FINISH	Bright
HARDNESS	Rockwell B-78 Max.
THICKNESS TOLERANCE	± .0003 incl. crown
WIDTH TOLERANCE	± .005
MICROSTRUCTURE	Uniform spheroids
COIL SIZE	16" I.D. coils large as possible
PACKAGING	On skids — shrouded

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SIZE	10 x .020
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ANALYSIS	1095
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HARDNESS	95 to 105 Rockwell B suitable for blanking
THICKNESS TOLERANCE	± .0005 incl. crown
WIDTH TOLERANCE	± .005
MICROSTRUCTURE	Uniform medium size spheroids
COIL SIZE	16" — I.D. Max. coil wt. 600#
PACKAGING	On skids — shrouded

J&L STEEL

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FORMERLY THE COLD METAL PRODUCTS COMPANY

Market Outlook

CONTINUED slow buying is reflected by shrinking steel order backlogs. The result: Primary steelmaking operations were cut last week at important producing centers. The national ingot rate slipped another 2.5 percentage points to 69 per cent, the lowest level of operation since October, 1954, except for holiday and strike periods.

SUBSTANTIAL VOLUME—Despite the curtailed ingot rate, tonnage is still pouring from furnaces at an estimated 1,770,000 net tons weekly. Volume will be cut somewhat over the holidays, but indications are that primary production is approaching balance with finishing mill operations.

PUSHED PRODUCTION—Throughout the fall, producers pushed ingot production beyond the requirements of finishing mills. They are now working off the stocks they inventoried. Generally, finishing operations are holding at a higher level than ingot production.

BUYING LAGS—As far as new finished steel business is concerned, mills report orders are flowing in steadily, but they are for small lots and on a hand-to-mouth basis. Except for plates and shapes, mill commitments are below capacity in most cases; there is distressing absence of forward ordering. Producers of specialty tool steels and hardened steels for high temperature work report a flood of inquiries stemming from the prospect of more missile business.

AUTO PROSPECTS— Steelmakers are hoping for at least a modest pickup in automotive demands next quarter. But it is rumored that some projected January auto production schedules may be cut 22 to 23 per cent from December levels. Ford, Buick, Oldsmobile, and Pontiac are mentioned.

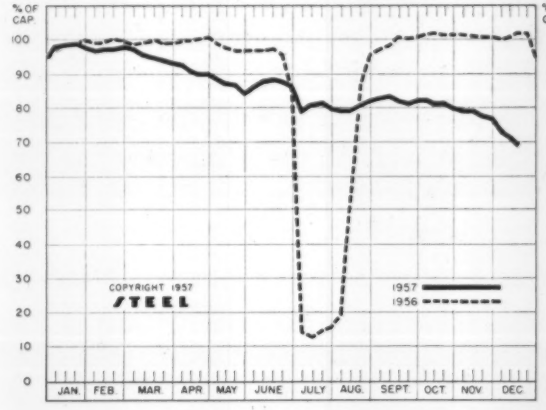
SLUMP EXPLAINED—In analyzing lagging steel demand, steelmen cite several factors: 1. Yearend inventory taxes. 2. Widespread dependence of consumers on minimum stockpiles. 3. Availability of prompt mill shipments in most products. 4. Seasonal slackening in construction. 5. Economic uncertainties stemming from the international political situation.

HEAVY SHIPMENTS—Although demand has been sluggish this fall, mill shipments of finished products have held up well. The October movement totaled 6,550,690 net tons, against 6,171,674 the preceding month and 7,930,957 in October, 1956. Estimates put 1957 total mill shipments at around 81.3 million tons, against 83.3 million in 1956.

PRICES WATCHED—Buyers are giving close attention to prices. Steel mill quotations are holding firmly, with STEEL's arithmetical composite on finished products unchanged at $146.03. The slashing of warehouse prices at Los Angeles, reported a week ago, may spread. Rumors of price cutting were circulating at Pittsburgh last week.

SCRAP SLIPPING—The absence of active mill and foundry demand continues to force scrap prices lower, though the pace of the decline has slackened noticeably. STEEL's composite on the prime steelmaking grade last week fell another 33 cents to $32, a new low since October, 1954.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

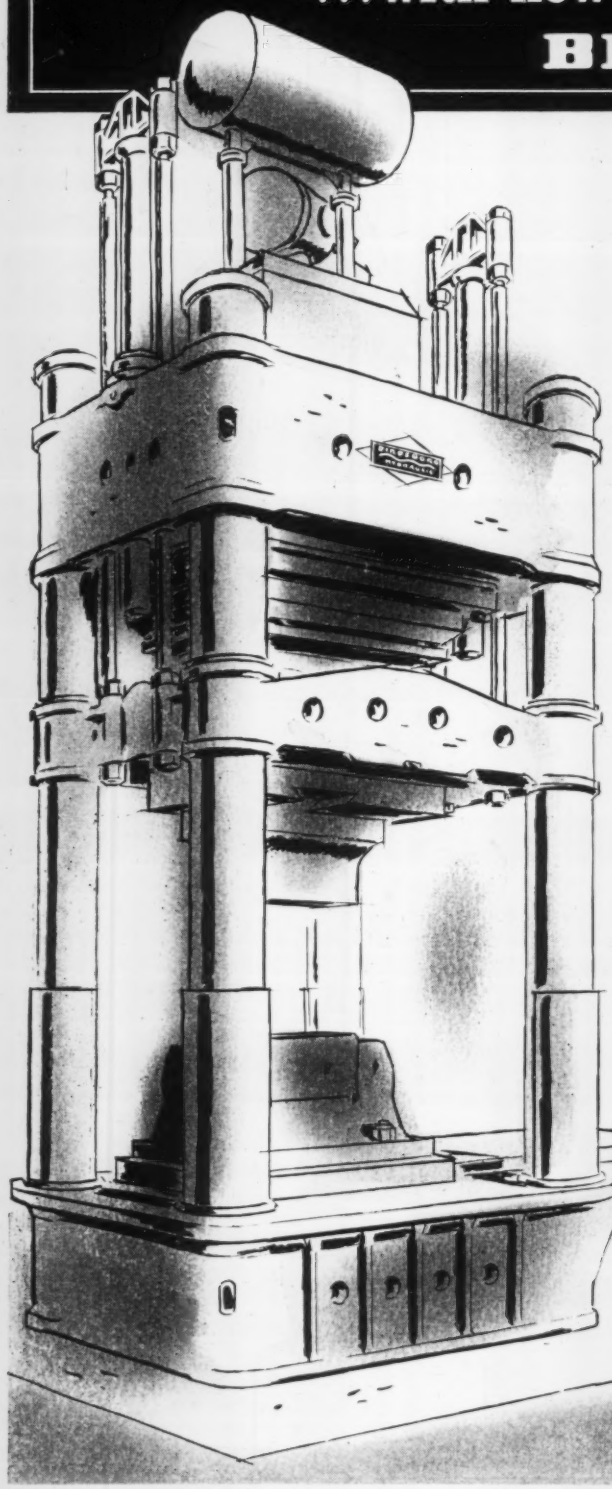
	Week Ended Dec. 15	Change	Same Week 1956	Same Week 1955
Pittsburgh	67.5	— 7.5*	102.5	102
Chicago	75.5	+ 0.5*	101	99
Mid-Atlantic	81	— 1	102	99
Youngstown	65	— 6	104	100
Wheeling	61.5	+ 1	100	103
Cleveland	68.5	0*	104.5	98
Buffalo	63.5	0	107.5	105
Birmingham	67	+ 5.5	94	94.5
New England	52	0	70	89
Cincinnati	72.5	— 0.5*	93.5	92.5
St. Louis	60.5	—15	95.5	107.5
Detroit	90.5	+ 1	103.5	100.5
Western	80	— 4	103	107
National Rate	69	— 2.5	102	100

INGOT PRODUCTION‡

	Week Ended Dec. 15	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	110.6†	114.0	123.9	157.0
NET TONS (In thousands)	1,777†	1,831	1,990	2,522

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

advancing the FORGING FRONTIER ...with new press designs by BIRDSBORO



Forging high temperature alloys and some of the "wonder" metals is no longer the problem it once was. Birdsboro, working in close cooperation with customers, has developed new design press features that make possible fast, economical forging of hard-to-work alloys.

Features like these help form a good base for Birdsboro hydraulic press progress:

- Rugged design and construction minimize misalignment and assure accurate mating of dies.
- Integral design features resist severe off-center loads.
- Arrangements for automated high-speed forging planishing.
- Full utilization of hydraulic and electric systems.
- Accurate, instantaneous controls assure volume production with safety.
- Each press fully assembled and factory tested for rapid installation at customer's site.
- Over 40 years' experience in heavy duty press design.

Whether your future press work involves doing new things with new metals or getting more press production with less money, your Birdsboro representative can be of considerable help. *Main office and plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa., *Subsidiary:* Engineering Supervision Co., 120 W. 42nd St., New York 36, N. Y. FP - 157

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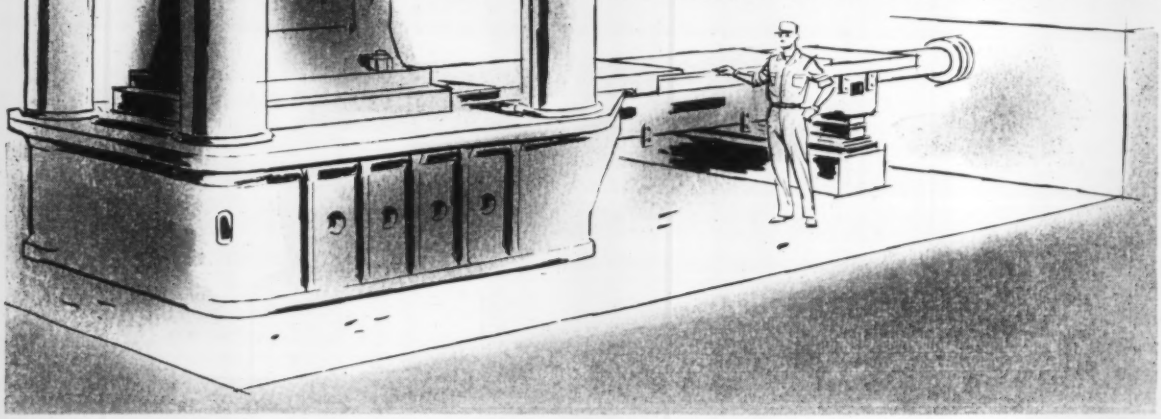


Interlake Iron Corp.

Pig Iron Use Sets Record

Percentage of blast furnace capacity engaged has exceeded the rate of ingot production throughout the year. Falling scrap prices show little effect on operations

RECORD - BREAKING pig iron production this year will be close to 81.3 million net tons. Two factors have helped: 1. A high level of steelmaking operations. 2. The percentage of pig iron used in steelmaking is higher than it was last year.

The recent decline in steelmaking and foundry consumption has brought about a reduction in blast furnace production. At the end of October, 49 of the nation's 257 blast furnaces making pig iron had been banked or blown out. More will be idled unless conditions improve soon.

Forecast — Prospects are that demand for both merchant and nonmerchant iron in 1958 will trail the 1957 pace.

There is nothing to suggest that foundry or steelmaking operations in the first half of 1958 will improve much over 1957's fourth quarter level. The second half is expected to show improvement.

Some Figures — Blast furnace production in the first ten months of 1957 came to 68,280,112 net tons, or 10.8 per cent ahead of the corresponding period of last year. Steel ingot production in the first ten months of this year totaled 96,901,792 tons, or 3.3 per cent ahead of the 1956 figure. (Both blast furnace and ingot production were affected by the steel strike in 1956.)

Blast furnaces ran at an average of 94.5 per cent of capacity in the first ten months of 1957, compared with an 87 per cent average rate for steelmaking furnaces. Ordinarily, the spread between these rates is only a point or two.

A Decline—Merchant iron shipments during the first nine months of 1957 totaled 5,236,993 tons, according to the American Iron & Steel Institute. That's a drop of 579,695 tons (or 10 per cent) from the corresponding period of 1956. Shipments are now falling off at a steeper rate.

Merchant shipments of malleable, silvery, and foundry pig during the first nine months of 1957 were 13.5 per cent behind those of the similar period of last year. This year, shipments of merchant iron to steel ingot producers (including ingot mold producers) were down 21 per cent in the first nine months, compared with the same period of 1956.

Producers of ingot molds for the steel industry reduce their operations faster than ingot production declines during a recession period, and they expand their operations faster than steelmaking operations rise when improvement sets in. Ingot molds are made from blast furnace hot metal or cold pig.

Static Outlook — Demand for castings and steel products does not show signs of improving in the early months of 1958. Automotive foundries are experiencing a modest increase in schedules as assemblies of 1958 models accelerate; agricultural implement foundries are holding on to their recently boosted activity; but no other segments of industry appear likely to expand their need for ferrous castings in the near future. Industrial and residential construction, an important user, will probably show

only modest gains next year.

The price of steelmaking scrap has dropped about 50 per cent from its all-time peak of December, 1956. But the scrap to pig iron ratio has changed little. Nonintegrated steel mills are using larger proportions of scrap than they did, but there is a limit on how far they can go. Scrap contains more tramp elements than it did formerly. Since product specifications are higher (now that competition has strengthened), scrap use must be held down to avoid contamination of the new steel.

When To Cut—Integrated steelmakers have a different problem. As steelmaking operations decline, they keep blast furnaces running as long as possible because it is costly and sometimes damaging to idle them. During such a period, the practice is to use more hot metal and less scrap in steel. Only a favorable price could bring about an increase in the use of scrap under such conditions.

Some large steelmakers have adopted a policy of using large pig iron proportions (75 per cent or more) regardless of the economics of iron versus scrap.

Statistics indicate that in nine months of this year 22.8 per cent of iron made for sale was shipped to steelmakers. In the corresponding period of 1956, the percentage was 20.4.

No Dumping—Sellers agree that steelmakers are not dumping pig iron on the merchant market. One comment is that there is no market in which to dump it. Some pig iron that was originally scheduled for the export market is probably being sold domestically, but it's an emergency operation by agents who contracted with blast furnaces for tonnages, then found their foreign buyers had reneged.

Export demand for pig iron is light. A year ago, Japan was a strong customer, but with the commitments filled, that country is out of the market. In its place, India has taken the leading spot with modest tonnages. Some pig has gone to the Philippines and Canada.

Pig Iron . . .

Pig Iron Prices, Page 152

Pig iron demand continues to lag and is expected to remain slow over the balance of the year. Foundries are restricting purchases to tonnages needed to sustain present operations because their order backlogs are equivalent to only a little over two weeks' output. They are operating at no more than 32 hours a week in most districts.

Producers have stockpiled considerable tonnages, and the movement to curtail operations is spreading. In the Chicago district only 31 of 43 blast furnaces are active. That's the lowest figure since September, 1954, when 30 were active. Youngstown Sheet & Tube Co. idled its No. 2 furnace at the Indiana Harbor (Ind.) Works on Nov. 23. U. S. Steel Corp. idled its No. 6 stack at the South Works, South Chicago, Ill., on Nov. 30.

Jones & Laughlin Steel Corp. took one of its two blast furnaces out of production at its Cleveland Works Div. on Dec. 6. Only half of the ten furnaces in the Cleveland district are in production—primarily due to lack of demand.

"We found a GOLD MINE OF TOP-QUALITY LABOR in Uniontown, Pa."

...says W. F. Rockwell, Jr., President
Rockwell Manufacturing Company

Rockwell Manufacturing opened its water meter plant in Uniontown, Pa., in 1953 — substantially enlarged it in 1956. Here's how Mr. Rockwell feels about the high quality of the labor available in this typical WESTern PENNsylvania community:

"Our production calls for a lot of highly skilled precision work performed to close tolerances. Our Uniontown employees have proved that a solid mining community background fits people for this sort of employment. They took very little time to train — and have turned in a record performance. We attribute these standout qualities to a fairly high level of mechanical aptitude and skill, plus a sound, healthy attitude toward work."

Send for this
FAYETTE COUNTY SKILL SURVEY*

Considering a new plant location? Get this unique, factual study of specific skills possessed by *available* workers in this typical WESTern PENNsylvania area. Check it against the skills *you* need. Mail coupon below.

*Prepared January, 1957 by Penna. Dept. of Labor and Industry

Area Development Department 5-1216
West Penn Power Company
Cabin Hill, Greensburg, Pa.
I would like a copy of the "Fayette County Skill Survey", showing specific mechanical aptitudes and skills available in the area.

Name_____ Title_____
Company_____
Address_____
City and State_____

WEST PENN POWER
an operating unit of the WEST PENN ELECTRIC SYSTEM

Iron Ore . . .

Iron Ore Prices, Page 153

December shipments of Lake Superior iron ore, which dwindled to 19,498 gross tons, brought the 1957 lake navigation season shipment total to 84,614,734 gross tons, reports the American Iron Ore Association. The season totals for the last 11 years are given for comparison:

	Gross Tons
1957	84,614,734
1956	77,633,027
1955	87,459,853
1954	60,793,697
1953	95,844,449
1952	74,910,798
1951	89,092,012
1950	78,205,592
1949	69,556,269
1948	82,937,192
1947	77,898,087

Sheets, Strip . . .

Sheet & Strip Prices, Pages 148 & 149

Major sheetmakers are pinning their hopes on an upswing in sheet sales after Jan. 1, having abandoned expectations of any improvement in demand the rest of this year.

Slow December sales are attributed to yearend inventory taxes by one Pittsburgh area producer of cold rolled. This seller says auto builders' stocks are down to 15 days' supply.

With sheet deliveries generally available in three or four weeks, the mills have received few orders for January shipment.

Cutbacks in production scheduling by automakers may make for slower deliveries in January. Ford and Buick reportedly are cutting production schedules 22 to 23 per cent in January (vs. December). Oldsmobile and Pontiac also are making reductions.

General Motors' Transmission Div. is cutting orders for specialty strip and spring steels 30 per cent in January and February.

The production slowdowns are shoving late December sheet and strip deliveries back to January, and January orders for similar quantities are being canceled, report Detroit sellers.

If there is no improvement in auto demand in early first quarter, the sheet market will remain dull throughout much of the year, in the opinion of one important producer.

At Cleveland, automotive buying of hot and cold rolled is reported up 40 per cent from the July slump. But tonnage is not up to expectations. Customers are ordering often, four times a week in some cases, but less tonnage than normal is involved in the separate orders. The fact that auto production is estimated around 75 per cent of capacity leads some sheetmakers to think automotive sheet inventories still are substantial.

Stainless Steel . . .

Stainless Steel Prices, Page 151

Jones & Laughlin Steel Corp., Pittsburgh, will spend about $16.3 million for plant and equipment at its new stainless sheet and strip mill under construction at Louisville, Ohio.

Martin K. Schnurr, head of the

HE'S MINING THE HOTTEST RUBBER IN THE WORLD!

In its final stage . . . this rubber will be called SILICONE. If you have a rubber part problem involving extremely high temperatures, SILICONE can be your answer.

Stalwart engineers are prepared to produce standard or special SILICONE compounds in virtually any shape to meet your requirements. Extruded, molded or die-cut and machine-cut shapes can be delivered in any production quantity.

While we think of rubber as generally coming from trees, today's synthetics are coming from many diversified directions. In this case . . . it's rubber from rock.

STALWART RUBBER COMPANY

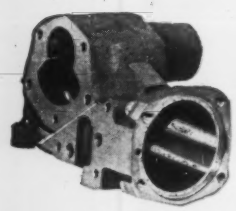
MANUFACTURING PLANTS IN BEDFORD, OHIO AND JASPER, GEORGIA: MAIN OFFICES AT 167 NORTHFIELD RD., BEDFORD, OHIO

7644-SR

Why MICROHONING

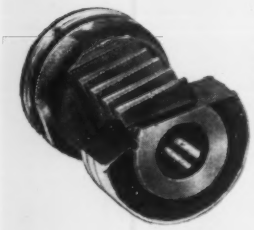
Is Final Stock Removal Process For Interrupted and Blind-End Bores

To secure low-cost, final stock removal, that generates accuracy and functional surface characteristics in a variety of bore conditions, a leading manufacturer of power steering assemblies uses Microhoning. Here are details concerning types of bores and stock removal results obtained by using Micromatic "Know How"—



STEERING GEAR HOUSING—Microhoning consistently corrects cumulative inaccuracies of preceding operations—reduces scrap—permits faster boring—cuts boring tool sharpenings—lowers down-time and tool costs.

Material: Soft Malleable Iron
Bore: 3.125"D x 6.93"L (Ported bore with ¼" relief at blind end)
Stock Removal: .002"
Finish: 50 Microinches RMS
Microhoning Cycle: 18 sec.
Preceding Operation: Boring



PISTON RACK—Microhoning answers the need for a final stock removal process that generates a controlled surface finish in the bore of this leaded steel part. Microhoned surface (cross hatch) prevents oil leakage and holds to a minimum the wear of seal that operates in the bore.

Material: Leaded Steel (Rockwell 62 "C")
Bore: .875"D x 3"L
Stock Removal: .005"
Finish: 20 Microinches RMS
Microhoning Cycle: 20 sec.
Preceding Operation: Boring and H.T.

VALVE HOUSING—Microhoning consistently holds size and geometric accuracy—meets stringent surface requirements—assures alignment of four lands in bore. Thus, there is no leakage of oil around control valve which is selectively fitted to its housing.

Material: Cast Iron
Bore: .770"D x 2.18"L (Interrupted)
Stock Removal: .0025"
Tolerances: Size .0005"
Roundness .0001"
Straightness .0001"
Finish: 10 Microinches RMS
Microhoning Cycle: 12 sec.
Preceding Operation: Boring

The principles and application of Microhoning are explained in a 30-minute, 16mm, sound movie, "Progress in Precision" . . . available at your request.

☐ Please send me "Progress in Precision" in time for showing on _____ (date).
☐ Please have a Micromatic Field Engineer call.
☐ Please send Microhoning literature and case histories.

NAME _____ G
TITLE _____
COMPANY _____
STREET _____
CITY _____ ZONE _____ STATE _____

MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

company's Stainless Steel Div., told a Rotary luncheon meeting at Canton, Ohio, his company will be able to produce about 36,000 net tons of stainless sheets and strip annually in the new facilities, housed in renovated and new buildings on the site of the old Superior Sheet Steel Co.

He said operations are scheduled to begin in the third quarter of next year. The plant will employ about 450 when it attains normal production.

Tool Steel . . .

Tool Steel Prices, Page 151

Shipments of high speed and tool steel (excluding hollow drill steel) totaled 7435 net tons in October, reports the American Iron & Steel Institute. In September, 7915 tons were shipped; in October a year ago, 10,790 tons.

October's tonnage brought total shipments in the first ten months of the year to 84,946 tons. This compares with 107,305 in the like period of last year.

Tubular Goods . . .

Tubular Goods Prices, Page 151

Sluggish demand for tubular goods is being reflected in slackening mill operations at various producing points, including Youngstown where two producers announced steelmaking curtailments last week. Pipe mill operations in the East range from 65 to 70 per cent.

Consolidated Western Steel Div., U. S. Steel Corp., Provo, Utah, will close its small diameter pipe mill temporarily because of lack of demand. Operations at the large diameter pipe mill will be reduced from three to two shifts daily.

Steel pipe buying has slackened noticeably. In the East and in New England, utilities are turning back some tonnage placed earlier this year. In covering 1958 requirements, the utilities are more conservative in estimating their seamless needs.

Distributors' stocks are well balanced, and, in some cases, buttweld pipe inventories are on the high side.

Mechanical and pressure tubing requirements are limited.

Oil well drillers are reducing their stocks of oil country tubing.

Well completions are expected to rise in 1958, but it is thought likely the low-inventory policy will be continued, holding down mill shipments.

Mechanical tubing requirements of the automakers are being held down by the availability of prompt shipments of sheets. Tubing purchases are in proportion to sheet buying.

Seamless tubing is available from Pittsburgh mills in less than a month.

Plates . . .

Plate Prices, Page 147

Purchasers are having little difficulty obtaining plates from most supply sources. At Pittsburgh, a producer of the wide sheared product continues to run behind schedule on its deliveries by as much as two months, but by "blanking out" a part of its first quarter order book, it expects to become current on deliveries by March.

Some heavy construction firms report their stocks are unbalanced because of the continued relative tight supply in heavy plates. Freer supplies at the warehouse level are filling supply gaps more frequently.

On the West Coast, producers report fourth quarter sales are about 10 per cent under those in the like period last year. The largest pending job in the Pacific Northwest involves 500 tons for the Ft. Peck, Mont., powerhouse.

Steel Bars . . .

Bar Prices, Page 147

Carbon and alloy bar orders for January shipment are coming out slowly. Prompt delivery orders for December add up to less hot-rolled volume, with one or two sizes and grades per order, emphasizing hand-to-mouth fill-in buying by the bulk of consumers who are depending largely on inventories.

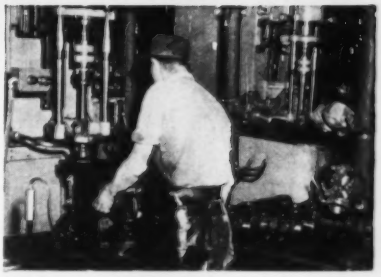
Most current orders are for prompt shipment, one week to 10 days for hot-rolled, and from stock on carbon finished in a fairly large range of sizes. Producers built up sizable stocks of billets in recent weeks.

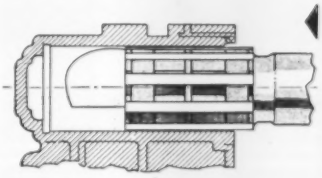
A pickup in demand in January is regarded as uncertain. Suppliers expect most consumers to slow down manufacturing operations

How MICROHONING

Cuts Costs—Generates Accuracy—Speeds Production of Interrupted, Blind-End Bores

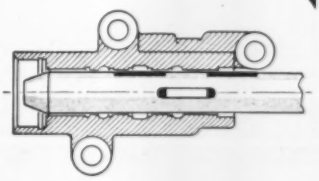
Shown are two Microhoning machines that are used in the plant of a leading manufacturer of automotive power steering assemblies. Machines are equipped with automatic stone feed and stonewear compensating mechanisms, and automatic sizing controls. A two-position rotary fixture is interlocked with machine controls for fully automatic index cycle. The following applications tell more of the "how".





STEERING GEAR HOUSING—In Microhoning the ported, blind-end bore of steering gear housing a nine-stone tool is used. At least six of nine stones are in contact with bore surface when tool passes over irregularly shaped port. Removing .002" of stock from 3.125"D x 6.93"L bore in 18 seconds, Microhoning generates final accuracies and a controlled finish of 50 microinches as specified.

PISTON RACK—In 20 seconds, Microhoning removes .005" of stock from .875"D x 3"L open end leaded steel bore of piston rack. Self-sharpening abrasives assure a consistent generation of specified surface finish of 20 microinches.



VALVE HOUSING—Microhoning tool used for final stock removal in bore of valve housing has one bank of stones and two banks of plastic guides—three stones or guides in each bank. Guides act as tool pilots and stabilizers in interrupted bore—prevent overcutting at edges of lands—assure straight bore by keeping tool aligned. Self-dressing abrasives consistently generate geometric accuracy of .0001" and surface finish of 10 microinches.

Microhoning economically removes stock—corrects cumulative inaccuracies of preceding operations—reduces scrap—permits faster boring—lowers machine tool downtime and maintenance to cut costs and speed production.

Send Coupon for Complete Information

Learn how Microhoning will give efficient stock removal, closer tolerances, accurate alignment and functional surfaces.

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☐ Please send Micromatic literature and case histories.

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COMPANY_____

STREET_____

CITY_____ZONE_____STATE_____

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We took a tip from a typist

The question came up at a Heads-of-Departments meeting. Production told Personnel that his new typist asked that a portion of her salary be set aside for U. S. Savings Bonds. Could it be arranged?

This one question posed another: How many more employees, like the typist, would like to buy Savings Bonds automatically through Payroll Savings, yet, were not aware that we've had a Plan for years?

Finding out was simple.

A phone call brought the assistance of our State Savings Bond Director. He helped plan a company-wide campaign, and provided all the materials to inform our people about the advantages of U. S. Savings Bonds. Everyone received an application card.

The upshot? Employee participation shot up to the highest percentage since the mid-Forties. And the whole program was conducted in good order. Work was never interrupted.

Today there are more Payroll savers than ever before in peace time. Look up your State Director in the phone book or write: Savings Bonds Division, U. S. Treasury Dept., Washington, D. C.

STEEL
The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

late this month. To what extent they will resume after the holidays is unknown.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 147

Buyers of concrete reinforcing bars are ordering for specific requirements, but they are not buying much for inventory. Prompt shipments and ample supplies make it possible for them to order on shorter leadtime.

Bridge requirements are off in the East; general construction, except for schools, is also off.

Competition is an increasing factor, with distributors in the East clipping prices on attractive tonnages. Mill prices to fabricators are firm, but the fabricating shops are more frequently narrowing their margins, though contractors' estimates for deformed bars in place are close to earlier peaks, 12.00 cents to 14.00 cents a pound, depending on engineering specifications.

Wire . . .

Wire Prices, Pages 149 & 150

Wire mills operating at more than 60 per cent of capacity in the East are the exception. December bookings are the lowest this year in the case of carbon wire, including heading grades and high carbon spring wire.

Forecasts for January are that tonnage requirements will be slightly heavier, but orders booked by the mills for the first quarter so far are light. Automotive industry releases for valve spring and other wire specialties for early 1958 shipment are slightly heavier.

Merchant wire products are in slow demand. This is normal for the season. Where rod inventories are heavy, lower redrawing schedules are slowing down liquidation of semifinished stocks.

Coal Chemicals . . .

Coal Chemical Prices, Page 153

Jones & Laughlin Steel Corp., Pittsburgh, has started production of high-purity benzene, toluene, and xylene in a plant built for the company by the Badger Mfg. Co. of Cambridge, Mass. Esso Standard Oil's Hydrofining and Universal Oil Products Co.'s Udex processes, engineered for the oil

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WHEELOCK, LOVEJOY & COMPANY, INC.

131 Sidney Street, Cambridge 39, Mass.

industry, have been combined in this coal chemical application.

The plant has a control house completely integrated with other process units. Hydrogenation has been substituted for conventional acid washing.

Tin Plate . . .

Tin Plate Prices, Page 149

Demand for tin plate has not dropped off as much as some observers had feared. Sales, though, are under those in fourth quarter, 1956. Users have larger inventories than they had following the 1956 steel strike. Result: Sales currently are in the normal seasonal decline typical of peacetime.

Semifinished Steel . . .

Semifinished Prices, Page 147

Cutbacks in steelmaking operations at several important producing points last week lowered the national ingot rate to an estimated 69.5 per cent of rated capacity.

At Youngstown, curtailments by Republic Steel Corp. and Youngstown Sheet & Tube Co. lowered the district rate six points to 65 per cent.

Structural Shapes . . .

Structural Shape Prices, Page 147

Inventories of structural fabricating shops are closer to balance as their bookings decline and shipments improve. Pressure on the structural mills is easing as a result, and indications are eastern shape producers will be current with demand by yearend.

Bridge contracts in the East approximate 25,000 tons, including the main superstructure of the Throggs Neck Bridge, New York. Pending work is down, notably large tonnage projects.

More fabricating shops are estimating on the separate jobs that appear, and price and delivery are factors of increasing importance in the placement of contracts.

Chicago's commissioner of public works claims the time lapse between ordering fabricating structural steel and delivery is still holding back bridge construction on tollways and highways. The city claims the waiting period is 12 months, compared with 15 until recently.

Cook County is adopting a new policy of advance procurement of materials for expressways. The county proposes to stockpile structural and concrete girders and resell them to contractors at the county's cost. First bids are on $5 million worth of materials for 21 grade separations and two main drains on the northwest and south expressways. Contracts for the construction will be let early next year.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

7600 tons, power plant, Unit 4, Consolidated Edison Co., Astoria, N. Y., to Grand Iron Works Inc., New York.

3000 tons, race track grandstand, Monticello, N. Y., to Schacht Steel Construction Inc., New York; Yonkers Contracting Co., Yonkers, N. Y., general contractor.

1345 tons, state service building, Denver, Colo., to Burkhardt Steel Co., Denver; Mead & Mount Construction Co., Denver, general contractor.

1250 tons, building Stage 3, Prudential Insurance Co., Newark, N. J., to Schacht Steel Construction Inc., New York; Vermilya-Brown Co., New York, general contractor.

1200 tons, foundry-shop buildings and research, Walworth Co., Braintree, Mass., to Waghorne-Brown (Bethlehem Fabricators Inc.), Boston; George A. Fuller Co., Boston, general contractor.

700 tons, building, Stage 4, Prudential Insurance Co., Newark, N. J., to Lafayette Iron Works Inc., Jersey City, N. J.; Walter Kidde Constructors Inc., New York, general contractor.

490 tons, store, Two Guys from Harrison Inc., Bordentown, N. J., to Elizabeth Iron Works, Elizabeth, N. J.

440 tons, five-span composite girder bridge, Farmington River, Farmington, Conn., to Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., Claymont, Del.; Oneglia & Garvasini, Torrington, Conn., general contractor.

435 tons, six-span composite rolled beam bridge, Naugatuck River, Ansonia, Conn., to McDermott Steel Specialties Co., New Haven, Conn.; Mariani Construction Co., North Haven, Conn., general contractor.

400 tons, warehouse, Timco Co., Newark, N. J., to Elizabeth Iron Works, Elizabeth, N. J.; Wilhelm Construction Co., Newark, N. J., general contractor.

350 tons, foundry addition, Pelton Steel Casting Co., Milwaukee, to Wisconsin Bridge & Iron Co., Milwaukee.

250 tons, cofferdam framing, bridge, Ogdensburg, N. Y., to Reliance Steel Products Co., McKeesport, Pa.; Merritt-Chapman & Scott Corp., New York, general contractor.

170 tons, Baker River power project, Wash., to Pacific Car & Foundry Co., Seattle, for Puget Sound Power & Light Co., Seattle.

120 tons, transfer bridge, New York Dock Co., Brooklyn, N. Y., to American Bridge Div., U. S. Steel Corp., Pittsburgh.

100 tons, repairs to fire-damaged McChord Air Base hangar, to Bethlehem Pacific Coast Steel Corp., Seattle; (previously reported to unstated interest); Roy Earley Co., Tacoma, Wash., general contractor.

STRUCTURAL STEEL PENDING

9175 tons, 315-mile, 230-kv steel tower transmission line, Ft. Peck, Mont., to Bismarck, N. Dak.; bids to be invited in late December by U. S. Bureau of Reclamation.

510 tons, three state bridges, West Rutland-Rutland, Vt.; E. T. O'Neill & Son Construction Corp., Holyoke, Mass., low on general contract.

(*Please turn to Page* 155)

PIONEERS IN ALLOY CUSTOM FABRICATION

Look for this symbol of quality

- Fabrication of stainless steel, aluminum and other alloys from .020 to 3/16".
- Experience to fabricate close tolerances and intricate shapes.
- Acres of machinery for quantity production or prototype development.
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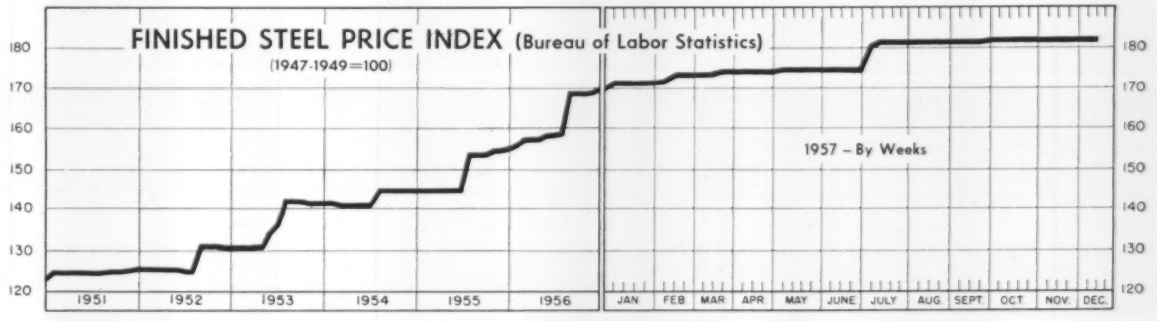
Price Indexes and Composites



Dec. 10, 1957	Week Ago	Month Ago	Nov. Avg.	Year Ago
181.7	181.7	181.7	181.7	168.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Dec. 10

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.600	Bars, Reinforcing (lb)	6.210
Rails, Light, 40 lb	7.067	Bars, C.F., Carbon	10.360
Tie Plates	6.600	Bars, C.F., Alloy	13.875
Axles, Railway	9.825	Bars, C.F., Stainless, 302 (lb)	0.553
Wheels, Freight Car, 33 in. (per wheel)	60.000	Sheets, H.R., Carbon	6.192
Plates, Carbon	6.150	Sheets, C.R., Carbon	7.089
Structural Shapes	5.942	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.535	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.650	Sheets, Electrical	12.025
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.80 (lb)	1.355	Strip, C.R., Carbon	9.243
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.850	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.525	Strip, H.R., Carbon	6.245
Bars, H.R., Stainless, 303 (lb)	0.525	Pipe, Black, Buttweld (100 ft)	19.814
Bars, H.R., Carbon	6.425	Pipe, Galv., Buttweld (100 ft)	23.264
		Pipe, Line (100 ft)	199.023
		Casing, Oil Well, Carbon (100 ft)	194.499
		Casing, Oil Well, Alloy (100 ft)	304.610
Tubes, Boiler (100 ft)	49.130	Black Plate, Canmaking Quality (95 lb base box)	7.583
Tubing, Mechanical, Carbon (100 ft)	24.953	Wire, Drawn, Carbon	10.225
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608	Wire, Drawn, Stainless, 430 (lb)	0.653
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783	Bale Ties (bundles)	7.967
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483	Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Dec. 11 1957	Week Ago	Month Ago	Year Ago	5 Yr. Ago
Index (1935-39 avg=100)	239.15	239.15	239.15	225.92	181.31
Index in cents per lb	6.479	6.479	6.479	6.111	4.912

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$146.03	$146.03	$146.03	$137.66	$110.98
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	62.63	55.04
Basic Pig Iron, GT	65.99	65.99	65.99	62.18	54.66
Malleable Pig Iron, GT	67.27	67.27	67.27	63.41	55.77
Steelmaking Scrap, GT	32.00	32.33	33.17	65.50	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Dec. 11 1957	Week Ago	Month Ago	Year Ago	5 Yr. Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld., Philadelphia	5.725	5.725	5.725	5.35	4.502
Bars, C.F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld., Philadelphia	5.545	5.545	5.545	5.40	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.10	5.10	5.10	5.25	4.35
Plates, Sparrows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.35
Sheets, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsburgh	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.75-4.225
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.25	7.25	7.25	6.95	5.30-6.05
Wire, Basic, Pittsburgh	7.65	7.65	7.65	7.20	5.10-5.225
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.20	6.20-6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.95	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, 7/32-5/8" Pitts.	6.15	6.15	6.15	5.80	4.425

PIG IRON, Gross Ton

	Dec. 11 1957	Week Ago	Month Ago	Year Ago	5 Yr. Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$63.50	$55.50
Basic, Valley	66.00	66.00	66.00	62.50	54.50
Basic, deld., Phila.	70.01	70.01	70.01	66.26	59.25
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, deld., Phila.	70.51	70.51	70.51	66.76	59.75
No. 2 Fdry, Birm.	62.50	62.50	62.50	59.00	51.38
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	66.70	58.93
Malleable, Valley	66.50	66.50	66.50	63.00	55.00
Malleable, Chicago	66.50	66.50	66.50	63.00	55.00
Ferromanganese, Duquesne	245.00†	245.00†	245.00†	235.00†	228.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$31.50	$31.50	$32.50	$66.50	$44.00
No. 1 Heavy Melt, E. Pa.	33.50	33.50	34.50	63.00	41.50
No. 1 Heavy Melt, Chicago	31.00	32.00	32.50	67.00	42.50
No. 1 Heavy Melt, Valley	29.50	29.50	31.50	66.50	44.00
No. 1 Heavy Melt, Cleve.	26.50	26.50	28.50	65.00	43.00
No. 1 Heavy Melt, Buffalo	31.50	32.50	32.50	62.50	43.00
Rails, Rerolling, Chicago	47.50	48.00	46.50	93.50	52.50
No. 1 Cast, Chicago	35.50	35.50	35.50	50.50	50.00

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$14.50	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	17.50	17.00

Everybody profits ...because

you belong

in this picture!

The publisher of this magazine is often asked what kind of a man you are . . . and how many like you are receiving his magazine.

Why is he asked?

Because the *advertisers* (whose money is his chief income) insist upon knowing the types of people (by industry or profession, by title) for whom the magazine is edited — and how many are getting it.

In order to standardize on the presentation of such information to advertisers and to have its accuracy vouched for by a disinterested third party, nearly 450 publishers have joined some 200 leading advertisers and advertising agencies in a non-profit organization called Business Publications Audit.

The purpose of BPA is to assure advertisers . . . by frequently checking and rechecking . . . that each member publisher is indeed distributing his magazine, in the *numbers* promised, to the *types* of men he promised would receive it.

The BPA symbol in this magazine means that *you belong* . . . that because of your occupational interests you are qualified, in the eyes of the advertisers, to receive it.

The advertiser can thus tell whether he's getting his money's worth.

The publisher has a better sales story to prospective advertisers because his magazine is "audited."

And you, the reader, get more value from the magazine because both the advertisers and editors, knowing what your special occupation is and what your interests are, are better able to prepare advertising and editorial material that will be most informative and useful to you.

What you can do

Publishers and advertisers frequently write to magazine readers to learn what kind of articles and advertisements appeal most. Cooperate with them — will you? — by answering their questions . . . in the interest of better communications between makers and markets.

BUSINESS PUBLICATIONS AUDIT OF CIRCULATION, INC.

420 Lexington Avenue New York 17, N. Y.

BPA

A NON-PROFIT, TRIPARTITE MEMBERSHIP CORPORATION OF ADVERTISERS, ADVERTISING AGENCIES AND BUSINESS PUBLICATIONS

Steel Prices

Mill prices as reported to STEEL, Dec 11, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 148; to footnotes, page 150.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$73.50

INGOTS, Alloy (NT)
Detroit S41 .....$77.00
Farrell,Pa. S3 .....77.00
Lowellville,O. S3 .....77.00
Midland,Pa. C18 .....77.00
Munhall,Pa. U5 .....77.00
Sharon,Pa. S3 .....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$77.50
Buffalo R2 .....77.50
Clairton,Pa. U5 .....77.50
Ensley,Ala. T2 .....77.50
Fairfield,Ala. T2 .....77.50
Fontana,Calif. K1 ....88.00
Gary,Ind. U5 .....77.50
Johnstown,Pa. B3 ....77.50
Lackawanna,N.Y. B2 ..77.50
Munhall,Pa. U5 .....77.50
S.Chicago,Ill. R2, U5..77.50
S.Duquesne,Pa. U5 ....77.50
Sterling,Ill. N15 .....77.50
Youngstown R2 .....77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$96.00
Buffalo R2 .....96.00
Canton,O. R2 .....98.50
Clairton,Pa. U5 .....96.00
Conshohocken,Pa. A3..101.00
Ensley,Ala. T2 .....96.00
Fairfield,Ala. T2 .....96.00
Fontana,Calif. K1 ....105.50
Gary,Ind. U5 .....96.00
Geneva,Utah C11 .....96.00
Houston S5 .....101.00
Johnstown,Pa. B2 .....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 .....105.50
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
Seattle B3 .....109.50
Sharon,Pa. S3 .....96.00
S.Chicago R2, U5, W14..96.00
S.Duquesne,Pa. U5 ....96.00
S.SanFrancisco B3 ....105.50
Warren,O. C17 .....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$114.00
Bridgeport,Conn. C32 ..114.00
Buffalo R2 .....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3 ..121.00
Detroit S41 .....114.00
Economy,Pa. B14 .....114.00
Farrell,Pa. S3 .....114.00
Fontana,Calif. K1 ....135.00
Gary,Ind. U5 .....114.00
Houston S5 .....119.00
Ind.Harbor,Ind. Y1 ...114.00
Johnstown,Pa. B2 .....114.00
Lackawanna,N.Y. B2 ..114.00
Los Angeles B3 .....134.00
Lowellville,O. S3 .....114.00
Massillon,O. R2 .....114.00
Midland,Pa. C18 .....114.00
Munhall,Pa. U5 .....114.00
Sharon,Pa. S3 .....114.00
S.Chicago R2,U5,W14 114.00
S.Duquesne,Pa. U5 ....114.00
Struthers,O.Y1 .....114.00
Warren,O. C17 .....114.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$117.50
Canton,O. R2 .....120.00
Cleveland R2 .....117.50
Gary,Ind. U5 .....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ....117.50
Warren,O. C17 .....117.50

SKELP
Aliquippa,Pa. J5 .....5.075
Munhall,Pa. U5 .....4.875
Warren,O. R2 .....4.875
Youngstown R2, U5 ..4.875

WIRE RODS
AlabamaCity,Ala. R2 ..6.15
Aliquippa,Pa. J5 .....6.15
Alton,Ill. L1 .....6.35
Buffalo W12 .....6.15
Cleveland A7 .....6.15
Donora,Pa. A7 .....6.15
Fairfield,Ala. T2 .....6.15
Houston S5 .....6.40
IndianaHarbor,Ind. Y1..6.15
Johnstown,Pa. B2 .....6.15
Joliet,Ill. A7 .....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 .....6.25
LosAngeles B3 .....6.95
Minnequa,Colo. C10 ....6.40
Monessen,Pa. P17 .....6.15
N.Tonawanda,N.Y. B11..6.15
Pittsburg,Calif. C11 ....6.95
Portsmouth,O. P12 .....6.15
Roebling,N.J. R5 .....6.25
S.Chicago,Ill. R2 .....6.15
SparrowsPoint,Md. B2 ..6.25
Sterling,Ill. (1) N15 .....6.15
Sterling,Ill. N15 .....6.25
Struthers,O. Y1 .....6.15
Worcester,Mass. A7 ....6.45

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 .....5.275
Atlanta A11 .....5.475
Aliquippa,Pa. J5 .....5.275
Bessemer,Ala. T2 .....5.275
Bethlehem,Pa. B2 .....5.325
Birmingham C15 .....5.275
Clairton,Pa. U5 .....5.275
Fairfield,Ala. T2 .....5.275
Fontana,Calif. K1 ....6.075
Gary,Ind. U5 .....5.275
Geneva,Utah C11 .....5.275
Houston S5 .....5.375
Ind.Harbor,Ind. I-2 ....5.275
Johnstown,Pa. B2 .....5.325
Joliet,Ill. P22 .....5.275
KansasCity,Mo. S5 .....5.375
Lackawanna,N.Y. B2 ..5.325
LosAngeles B3 .....5.975
Minnequa,Colo. C10 ....5.575
Munhall,Pa. U5 .....5.275
Niles,Calif. P1 .....5.925
Phoenixville,Pa. P4 ....5.325
Portland,Oreg. O4 .....6.025
Seattle B3 .....6.025
S.Chicago,Ill. U5, W14..5.275
S.SanFrancisco B3 ....5.925
Sterling,Ill. N15 .....5.275
Torrance,Calif. C11 ....5.975
Weirton,W.Va. W6 ....5.275

Wide Flange
Bethlehem,Pa. B2 .....5.352
Clairton,Pa. U5 .....5.275
Fontana,Calif. K1 ....6.225
IndianaHarbor,Ind. I-2..5.275
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 .....5.275
Phoenixville,Pa. P4 ....5.325
S.Chicago,Ill. U5 .....5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.65
KansasCity,Mo. S5 .....6.65
Munhall,Pa. U5 .....6.55
S.Chicago,Ill. U5 .....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....7.75
Bessemer,Ala. T2 .....7.75
Bethlehem,Pa. B2 .....7.80
Clairton,Pa. U5 .....7.75
Fairfield,Ala. T2 .....7.75
Fontana,Calif. K1 ....8.55
Gary,Ind. U5 .....7.75
Geneva,Utah C11 .....7.75
Houston S5 .....7.85
Ind.Harbor,Ind. I-2, Y1 7.75
Johnstown,Pa. B2 .....7.80
KansasCity,Mo. S5 .....7.85
Lackawanna,N.Y. B2 ..7.80
LosAngeles B3 .....8.45
Munhall,Pa. U5 .....7.75
Seattle B3 .....8.50
S.Chicago,Ill. U5, W14..7.75
S.SanFrancisco B3 ....8.40
Struthers,O. Y1 .....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 .....7.75
S.Chicago,Ill. U5 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.325
Lackawanna,N.Y. B2..5.325
Munhall,Pa. U5 .....5.275
S.Chicago,Ill. U5 .....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 .....6.225
S.Chicago,Ill. U5 .....6.225
Weirton,W.Va. W6 ....6.225

PLATES

PLATES, Carbon Steel
Ala.City, Ala. R2 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky. (15) A10..5.10
Bessemer,Ala. T2 .....5.10
Clairton,Pa. U5 .....5.10
Claymont,Del. C22 .....5.10
Cleveland J5, R2 .....5.20
Coatesville,Pa. L7 .....5.10
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 .....5.20
Fairfield,Ala. T2 .....5.10
Fontana,Calif.(30) K1 ..5.90
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.10
GraniteCity,Ill. G4 .....5.30
Harrisburg,Pa. P4 .....5.80
Houston S5 .....5.20
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa. B2 .....5.10
Lackawanna,N.Y. B2 ..5.10
LoneStar,Tex. L6 .....5.45
Mansfield,O. E6 .....5.10
Minnequa,Colo. C10 ....5.95
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Pittsburgh J5 .....5.10
Riverdale,Ill. A1 .....5.10
Seattle B3 .....6.00
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 .....5.10
Steubenville,C. W10 ....5.10
Warren,O. R2 .....5.10
Youngstown U5, Y1 ...5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....6.75
Fontana,Calif. K1 .....7.55
Geneva,Utah C11 .....6.75
Houston S5 .....6.85
Johnstown,Pa. B2 .....6.75
SparrowsPoint,Md. B2 ..6.75

PLATES, Wrought Iron
Economy,Pa. B14 .....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.625
Bessemer,Ala. T2 .....7.625
Clairton,Pa. U5 .....7.625
Claymont,Del. C22 .....7.625
Cleveland J5, R2 .....7.625
Coatesville,Pa. L7 .....7.925
Conshohocken,Pa. A3 ..7.625
Economy,Pa. B14 .....7.625
Ecorse,Mich. G5 .....7.725
Fairfield,Ala. T2 .....7.625
Farrell,Pa. S3 .....7.625
Fontana,Calif.(30) K1 ..8.425
Gary,Ind. U5 .....7.625
Geneva,Utah C11 .....7.625
Houston S5 .....7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 .....7.625
Munhall,Pa. U5 .....7.625
Pittsburgh J5 .....7.625
Seattle B3 .....8.525
Sharon,Pa. S3 .....7.625
S.Chicago,Ill. U5, W14 7.625
SparrowsPoint,Md. B2 ..7.625
Warren,O. R2 .....7.625
Youngstown U5 .....7.625

PLATES, ALLOY
Aliquippa,Pa. J5 .....7.20
Claymont,Del. C22 .....7.20
Coatesville,Pa. L7 .....7.20
Economy,Pa. B14 .....7.20
Farrell,Pa. S3 .....7.20
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 .....7.20
Houston S5 .....7.30
Ind.Harbor,Ind. Y1 ....7.20
Johnstown,Pa. B2 .....7.20
Lowellville,O. S3 .....7.20
Munhall,Pa. U5 .....7.20
Newport,Ky. A2 .....7.20
Pittsburgh J5 .....7.20
Seattle B3 .....8.10
Sharon,Pa. S3 .....7.20
S.Chicago,Ill. U5, W14..7.20
SparrowsPoint,Md. B2 ..7.20
Youngstown Y1 .....7.20

FLOOR PLATES
Cleveland J5 .....6.175
Conshohocken,Pa. A3 ..6.175
Ind.Harbor,Ind. I-2 ...6.175
Munhall,Pa. U5 .....6.175
S.Chicago,Ill. U5 .....6.175

PLATES, Ingot Iron
Ashland c.l. (15) A10..5.35
Ashland l.c.l. (15) A10..5.85
Cleveland c.l. R2 .....5.85
Warren,O. c.l. R2 .....5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.425
Aliquippa,Pa. (9) J5 ..5.425
Alton,Ill. L1 .....5.625
Atlanta(9) A11 .....5.625
Bessemer,Ala.(9) T2 ..5.425
Birmingham(9) C15 ..5.425
Buffalo(9) R2 .....5.425
Clairton,Pa. (9) U5 ....5.425
Cleveland(9) R2 .....5.425
Ecorse,Mich.(9) G5 .....5.525
Emeryville,Calif. J7 ...6.175
Fairfield,Ala(9) T2 ..5.425
Fairless,Pa. (9) U5 ..5.575
Fontana,Calif.(9) K1 ...6.125
Gary,Ind.(9) U5 .....5.425
Houston (9) S5 .....5.675
Ind.Harbor(9) I-2, Y1 5.425
Johnstown,Pa.(9) B2 ..5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
LosAngeles(9) B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 .....6.125
N.T'wanda,N.Y.(23)B11 5.775
Pittsburg,Calif.(9) C11..6.125
Pittsburgh(9) J5 .....5.425
Portland,Oreg. O4 .....6.175
Seattle B3, N14 .....6.175
S.Ch'e'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5..5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.425
Sterling,Ill.(9) N15 ....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..5.425
Torrance,Calif.(9) C11..6.125
Youngstown(9) R2, U5..5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 .....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.475
Bethlehem,Pa. B2 .....6.475
Bridgeport,Conn. C32 ..6.55
Buffalo R2 .....6.475
Canton,O. R2, T7 ....6.475
Clairton,Pa. U5 .....6.475
Detroit S41 .....6.475
Economy,Pa. B14 .....6.475
Ecorse,Mich. G5 .....6.575
Fairless,Pa. U5 .....6.625
Farrell,Pa. S3 .....6.475
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 .....6.475
Houston S5 .....6.725
Ind.Harbor,Ind. I-2, Y1 6.475
Johnstown,Pa. B2 .....6.475
KansasCity,Mo. S5 .....6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 .....6.475
LosAngeles B3 .....7.525
Massillon,O. R2 .....6.475
Midland,Pa. C18 .....6.475
Pittsburgh J5 .....6.475
Sharon,Pa. S3 .....6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 ....6.475
Struthers,O. Y1 .....6.475
Warren,O. C17 .....6.475
Youngstown U5 .....6.475

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....7.925
Bessemer,Ala. T2 .....7.925
Bethlehem,Pa. B2 .....7.925
Clairton,Pa. U5 .....7.925
Cleveland R2 .....7.925
Ecorse,Mich. G5 .....8.025
Fairfield,Ala. T2 .....7.925
Fontana,Calif. K1 .....8.625
Gary,Ind. U5 .....7.925
Houston S5 .....8.175
Ind.Harbor,Ind. Y1 ....7.925
Johnstown,Pa. B2 .....7.925
KansasCity,Mo. S5 .....8.175
Lackawanna,N.Y. B2..7.925
LosAngeles B3 .....8.625
Pittsburgh J5 .....7.925
Seattle B3 .....8.675
S.Chicago,Ill. U5, W14 7.925
S.Duquesne,Pa. U5 ....7.925
S.SanFrancisco B3 ....8.675
Struthers,O. Y1 .....7.925
Youngstown U5 .....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.575
Houston(9) S5 .....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
Sterling,Ill. N15 .....5.525
Sterling,Ill.(1) N15 ...5.425
Tonawanda,N.Y. B12 ..5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.425
Atlanta A11 .....5.625
Joliet,Ill. P22 .....5.425
Niles,Calif. P1 .....6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SanFrancisco S7 .....6.275
Seattle B3 .....6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.80
KansasCity,Mo. S5 ....6.80
Pittsburgh J5 .....6.55
Youngstown U5 .....6.55

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ...9.925
BeaverFalls,Pa. M12 ..9.925
Camden,N.J. P13 .....10.10
Chicago W18 .....9.925
Cleveland C20 .....9.925
Elyria,O. W8 .....9.925
LosAngeles S30
(Grade A) 11.30
(Grade B) 11.80
Los Angeles P2
(Grade A) 11.40
(Grade B) 11.90
Monaca,Pa. S17 .....9.925
Newark,N.J. W18 .....10.10
SpringCity,Pa. K3 .....10.10
Warren,O. C17 .....9.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....7.30
BeaverFalls,Pa. M12,R2 7.30
Birmingham C15 .....7.90
Buffalo B5 .....7.35
Camden,N.J. P13 .....7.75
Carnegie,Pa. C12 .....7.30
Chicago W18 .....7.30
Cleveland A7, C20 ....7.30
Detroit B5, P17 .....7.50
Detroit S41 .....7.30
Donora,Pa. A7 .....7.30
Elyria,O. W8 .....7.30
FranklinPark,Ill. N5 ....7.30
Gary,Ind. R2 .....7.30
GreenBay,Wis. F7 .....7.30
Hammond,Ind. J5, L2 ...7.30
Hartford,Conn. R2 .....7.80
Harvey,Ill. B5 .....7.30
LosAngeles (49) S30 ...8.75
LosAngeles P2, R2 ....8.75
Mansfield,Mass. B5 ....7.85
Massillon,O. R2, R8 ....7.30
Midland,Pa. C18 .....7.30
Monaca,Pa. S17 .....7.30
Newark,N.J. W18 .....7.75
NewCastle,Pa.(17) B4 ..7.30
Pittsburgh J5 .....7.30
Plymouth,Mich. P5 ....7.55
Putnam,Conn. W18 .....7.85
Readville,Mass. C14 ....7.85
S.Chicago,Ill. W14 .....7.30
SpringCity,Pa. K3 .....7.75
Struthers,O. Y1 .....7.30
Warren,O. C17 .....7.30
Willimantic,Conn. J5 ..7.80
Waukegan,Ill. A7 .....7.30
Youngstown F3, Y1 .....7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 6.55

BARS, Cold Finished Alloy
Ambridge,Pa. W18 ....8.775
BeaverFalls,Pa.M12,R2 8.775
Bethlehem,Pa. B2 .....8.775
Bridgeport,Conn. C32 ..8.925
Buffalo B5 .....8.775
Camden,N.J. P13 .....8.95
Canton,O. T7 .....8.775
Carnegie,Pa. C12 .....8.775
Chicago W18 .....8.775
Cleveland A7, C20 ....8.775
Detroit B5, P17 .....8.975
Detroit S41 .....8.775
Donora,Pa. A7 .....8.775
Elyria,O. W8 .....8.775
FranklinPark,Ill. N5 ....8.775
Gary,Ind. R2 .....8.775
GreenBay,Wis. F7 .....8.775
Hammond,Ind. J5, L2 ...8.775
Hartford,Conn. R2 .....9.075
Harvey,Ill. B5 .....8.775
Lackawanna,N.Y. B2 ..8.775
LosAngeles P2 .....10.75
LosAngeles S30 .....10.75
Mansfield,Mass. B5 ....9.075
Massillon,O. R2, R8 ....8.775
Midland,Pa. C18 .....8.775
Monaca,Pa. S17 .....8.775
Newark,N.J. W18 .....8.95
Plymouth,Mich. P5 ....8.975
S.Chicago,Ill. W14 .....8.775
SpringCity,Pa. K3 .....8.95
Struthers,O. Y1 .....8.775
Warren,O. C17 .....8.775
Waukegan,Ill. A7 .....8.775
Worcester,Mass. A7 ....9.075
Youngstown F3, Y1 .....8.775

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.425
Atlanta A11 .....5.625
Birmingham C15, S42 .5.425
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....5.775
Emeryville,Calif. J7 ..6.175
Fairfield,Ala. T2 .....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 ....6.125
Ft.Worth,Tex.(4)(26)T4 5.875
Gary,Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1 5.425
Johnstown,Pa. B2 ....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 ...5.675
Lackawanna,N.Y. B2 ..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ..6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 ....5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2 .5.425
Sterling,Ill.(*) N15 ..5.425
Sterling,Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ...6.00
Torrance,Calif. C11 ...6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.65
Chicago U8 .....6.91
Cleveland U8 .....6.89
Johnstown,Pa. B2 ....7.08
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Philadelphia U8 .....7.38
Pittsburgh J5, U8 ....7.10
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 ....7.08
St.Paul U8 .....7.92
Williamsport,Pa. S19 ..7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy,(Staybolt)B14 18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2.5.325
ChicagoHts.(4)(44) I-2 .5.425
ChicagoHts.(4) C2 ....5.425
Franklin,Pa. (3) F5 ..5.325
Franklin,Pa. (4) F5 ..5.425
JerseyShore,Pa.(3) J8 ..5.30
Marion,O.(3) P11 ....5.325
Tonawanda(3) R12 ....5.325
Tonawanda(4) B12 ....6.00
Williamsport,Pa. (3)S19.5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10 ..4.925
Cleveland J5, R2 ....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fairless,Pa. U5 .....4.975
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....4.925
Geneva,Utah C11 ....5.025
GraniteCity,Ill. (8)G4..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 .....4.925
Lackawanna,N.Y. B2 .4.925
Mansfield,O. E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ...4.925
Niles,O. M21, S3 .....4.925
Pittsburg,Calif. C11 ..5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 .....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2 .4.925
Steubenville,O. W10 ..4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5, Y1 ..4.925

SHEETS, H.R.,(19 Ga. & Lighter)

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ...8.10

SHEETS, H.R.(14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 .....7.275
Fairless,Pa. U5 .....7.325
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 ....8.175
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2, Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna (35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5, W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2 .7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ...7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.05
Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ..6.05
Fontana,Calif. K1 .....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 ....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ...7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 ....6.05
SparrowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ...6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville,O. W10 .....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.975
Ecorse,Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1 ...10.275
Gary,Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna(37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint (38) B2 8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	.6.95	7.20
Canton,O. R2	....6.95	7.45
Fairfield T2	....6.95	7.20
Gary,Ind. U5	....6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	..6.95	7.20
Irvin,Pa. U5	....6.95	7.20
Kokomo,Ind. C16	7.05	...
MartinsFry. W10	.6.95	7.20
Pitts.,Calif. C11	..7.70	...
Pittsburgh J5	....6.95	...
SparrowsPt. B2	..6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 .. 7.20

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.60‡
Ashland,Ky. A10 .....6.60†
Canton,O. R2 .....6.60‡
Dover,O. R1 .....6.60†
Fairfield,Ala. T2 ....6.60†
Gary,Ind. U5 .....6.60*
GraniteCity,Ill. G4 ....6.80*
Ind.Harbor,Ind. I-2 ...6.60†
Irvin,Pa. U5 .....6.60*
Kokomo,Ind. C16 ....6.70‡
MartinsFerry,O. W10 ..6.60*
Middletown O. A10 ...6.60†
Pittsburg,Calif. C11 ...7.35*
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ..6.60†
Warren,O. R2 .....6.60†
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ..9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland (28) R2 ...7.425
Niles,O. (28) R2 .....7.425
Weirton,W.Va. W6 ..7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).9.25
Butler,Pa. A10 (type 2).9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.625
Cleveland R2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.825
Ind.Harbor,Ind. I-2, Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 .....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.65
Ind.Harbor,Ind. I-2 ..8.475
Yorkville,O. W10 .....8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.00
Gary,Ind. U5 .....7.00
Mansfield,O. E6 .....7.00
Middletown,O. A10 ....7.00
Niles,O. M21, S3 .....7.00
Warren,O. R2 .....7.00
Weirton,W.Va. W6 ....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.40

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve.Cold Rolling Mills
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 CarpenterSteelofN.Eng.

D2 Detroit Steel Corp.
D3 Dearborn Div., Sharon Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.
E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel& Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md.Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.925
Allenport,Pa. P7 .....4.925
Alton,Ill. L1 .....5.125
Ashland,Ky.(8) A10 ..4.925
Atlanta A11 .....5.125
Bessemer,Ala. T2 ....4.925
Birmingham C15 .....4.925
Buffalo (27) R2 .....4.925
Conshohocken,Pa. A3 ..4.975
Detroit M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....4.925
Ind.Harbor,Ind. I-2, Y1 4.925
Johnstown,Pa. (25) B2 4.925
Lackaw'na,N.Y.(25) B2 4.925
LosAngeles(25) B3 ...5.675
Minnequa,Colo. C10 ..6.025
Pittsburg,Calif. C11 ..5.675
Riverdale,Ill. A1 .....4.925
SanFrancisco S7 .....6.35
Seattle(25) B3 .....6.35
Seattle N14 .....6.35
Sharon,Pa. S3 .....4.925
S.SanFrancisco(25) B3 5.675
SparrowsPoint,Md. B2 4.925
Sterling,Ill. (1) N15 ..4.925
Sterling,Ill. N15 .....5.025
Torrance,Calif. C11 ..5.675
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5 .....4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.10
Farrell,Pa. S3 .....8.10
Gary,Ind. U5 .....8.10
Houston S5 .....8.35
Ind.Harbor,Ind. Y1 ....8.10
KansasCity,Mo. S5 ....8.35
LosAngeles B3 .....9.30
Lowellville,O. S3 .....8.10
Newport Ky. A2 .....8.10
Sharon,Pa. A2 .....8.10
S.Chicago,Ill. W14 ....8.10
Youngstown U5, Y1 ..8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2 ....7.325
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.425
Fairfield,Ala. T2 ....7.325
Farrell,Pa. S3 .....7.325
Gary,Ind. U5 .....7.325
Ind.Harbor,Ind. I-2, Y1 7.325
Lackawanna,N.Y. B2..7.325
LosAngeles(25) B3 ....8.075
Seattle(25) R3 .....8.325
Sharon,Pa. S3 .....7.325
S.Chicago,Ill. W14 ....7.325
S.SanFrancisco(25) B3 8.075
SparrowsPoint,Md. B2..7.325
Warren,O. R2 .....7.325
Weirton,W.Va. W6 ....7.325
Youngstown U5, Y1 ..7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..5.175
Warren,O. R2 .....5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.15
Baltimore T6 .....7.15
Boston T6 .....7.70
Buffalo S40 .....7.15
Cleveland A7, J5 .....7.15
Conshohocken,Pa. A3 ..7.20
Dearborn,Mich. D3 ....7.25
Detroit D2, M1, P20 ..7.25
Dover,O. G6 .....7.15
Ecorse,Mich. G5 .....7.25
Evanston,Ill. M22 .....7.25
Follansbee,W.Va. F4 ..7.15
Fontana,Calif. K1 ....9.00
FranklinPark,Ill. T6 ...7.25
Ind.Harbor,Ind. Y1 ....7.15
Indianapolis J5 .....7.30
LosAngeles J5 .....9.05
LosAngeles C1 .....9.20
NewBedford,Mass. R10 .7.60
NewBritain(10) S15 ....7.15
NewCastle,Pa. B4, E5 ..7.15
NewHaven,Conn. D2 ...7.60
NewKensington,Pa. A6 .7.15
Pawtucket,R.I. R3 ....7.80
Pawtucket,R.I. N8 .....7.70
Philadelphia(45) P24 ...7.70
Pittsburgh J5 .....7.15
Riverdale,Ill. A1 .....7.25
Rome,N.Y. (32) R6 ...7.15
Sharon,Pa. S3 .....7.15
Trenton,N.J. (31) R5..8.60
Wallingford,Conn. W2 ..7.60
Warren,O. R2, T5 .....7.15
Weirton,W.Va. W6 ....7.15
Worcester,Mass. A7 ....7.70
Youngstown J5, Y1 ....7.15

STRIP, Cold-Rolled Alloy

Boston T6 .....15.40
Carnegie,Pa. S18 .....15.05
Cleveland A7 .....15.05
Dover,O. G6 .....15.05
Farrell,Pa. S3 .....15.05
FranklinPark,Ill. T6 ..15.05
Harrison,N.J. C18 ....15.05
Indianapolis J5 .....15.20
Lowellville,O. S3 .....15.05
Pawtucket,R.I. N8 ....15.40
Riverdale,Ill. A1 .....15.05
Sharon,Pa. S3 .....15.05
Worcester,Mass. A7 ...15.35
Youngstown J5 .....15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.45
Dearborn,Mich. D3 ....10.60
Dover,O. G6 .....10.45
Ecorse,Mich. G5 .....10.55
Farrell,Pa. S3 .....10.50
Ind.Harbor,Ind. Y1 ...10.65
Sharon,Pa. S3 .....10.50
Warren,O. R2 .....10.45

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	....	....
Fostoria,O. S1	10.05	11.15	13.10	16.10	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
Los Angeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn.(10) S15.	8.95	10.40	12.60	15.60	18.55
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y (32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6..	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.10	21.95	26.30
Buffalo W12	18.10	....	....
Fostoria,O. S1	18.30	22.15	....
FranklinPark,Ill. T6	18.45	22.30	26.65
Harrison,N.J. C18	18.10	21.95	26.30
NewYork W3	18.10	21.95	26.30
Palmer,Mass. W12	18.10	....	....
Trenton,N.J. R5	18.10	21.95	26.30
Worcester,Mass. A7, T6..	18.10	21.95	26.30
Youngstown J5	18.45	22.30	26.65

Weirton,W.Va. W6 ....10.50
Youngstown Y1 .....10.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....7.90

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.15*
Dover,O. G6 .....7.15*
Evanston,Ill. M22 ....7.25*
Riverdale,Ill. A1 .....7.25*
Warren,O. B9, T5 ....7.15*
Worcester,Mass. A7 ...7.70*
Youngstown J5 .....7.15*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....7.275

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Riverdale,Ill. A1 .....5.50
Sharon,Pa. S3 .....5.35
Youngstown U5 .....5.35

SILICON STEEL

H.R.SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95
Zanesville,O. A10 (SF Coils)	....	....	11.55	12.65	13.70

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10.	....	11.35	12.05	13.15	14.20
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	....	9.825*11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2	..	9.625*10.85*	11.55*	12.65*	....
Mansfield,O. E6	....	9.625*11.35	12.05	13.15	14.20
Vandergrift,Pa. U5	....	9.625*11.35	12.05	13.15	14.20
Warren,O. R2	....	9.625*11.35	12.05	13.15	14.20
Zanesville,O. A10(FP Coils)	....	11.35	12.05	13.15	14.20

H.R. SHEETS (22Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	14.75	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	17.60	19.20	19.70	20.20	....
Butler,Pa. A10	....	....	19.20	19.70	20.20	....
Vandergrift,Pa. U5	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.05	$10.30
Fairfield,Ala. T2	10.15	10.40
Fairless,Pa. U5.	10.15	10.40
Fontana,Calif. K1	10.80	11.05
Gary,Ind. U5 ..	10.05	10.30
Irvin,Pa. U5 ..	10.05	10.30
Pitts.,Calif. C11.	10.80	11.05
Sp.Pt.,Md. B2 ..	10.15	10.40
Weirton,W.Va. W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.85
Fairfield,Ala. T2	7.95
Fairless,Pa. U5	7.95
Fontana,Calif. K1	8.60
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. I-2, Y1	7.85
Irvin,Pa. U5	7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)	
Aliquippa,Pa. J5	$7.50
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. Y1	7.50
Irvin,Pa. U5	7.50
Yorkville,O. W10	7.50

MANUFACTURING TERNES (Special Coated, Base Box)	
Gary,Ind. U5	$9.70
Irvin,Pa. U5	9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)	
Gary,Ind. U5	$11.25

Niles,O. R2	7.85
Pittsburg,Calif. C11	8.60
SparrowsPoint,Md. B2	7.95
Weirton,W.Va. W6	7.85
Yorkville,O. W10	7.85

WIRE

WIRE, Manufacturers Bright, Low Carbon	
AlabamaCity,Ala. R2	7.65
Aliquippa,Pa. J5	7.65
Alton,Ill. L1	7.85
Atlanta A11	7.85
Bartonville,Ill. K4	7.75
Buffalo W12	7.65
Chicago W13	7.65
Cleveland A7, C20	7.65
Crawfordsville,Ind. M8.	7.75
Donora,Pa. A7	7.65
Duluth A7	7.65
Fairfield,Ala. T2	7.65
Fostoria,O.(24) S1	7.75
Houston S5	7.90
Jacksonville,Fla. M8	8.00
Johnstown,Pa. B2	7.65
Joliet,Ill A7	7.65
KansasCity,Mo. S5	7.90
Kokomo,Ind. C16	7.75
LosAngeles B3	8.60
Minnequa,Colo. C10	7.90
Monessen,Pa. P7, P16	7.65
N.Tonawanda,N.Y. B11	7.65
Palmer,Mass. W12	7.95
Pittsburg,Calif. C11	8.60
Portsmouth,O. P12	7.65
Rankin,Pa. A7	7.65
S.Chicago,Ill. R2	7.65
S.SanFrancisco C10	8.60
SparrowsPoint,Md. B2	7.75
Sterling,Ill.(1) N15	7.65
Sterling,Ill. N15	7.75
Struthers,O. Y1	7.65
Waukegan,Ill. A7	7.65
Worcester,Mass. A7	7.95

WIRE, Gal'd ACSR for Cores	
Bartonville,Ill. K4	12.65
Buffalo W12	12.65
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	12.65
Minnequa,Colo. C10	12.775
Monessen,Pa. P16	12.65
Muncie,Ind. I-7	12.85
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	12.95
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	12.75
Struthers,O. Y1	12.65
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	9.30
Alton,Ill. L1	9.50
Buffalo W12	9.30
Cleveland A7	9.30
Donora,Pa. A7	9.30
Duluth A7	9.30
Johnstown,Pa. B2	9.30
KansasCity,Mo. S5	9.55
LosAngeles B3	10.25
Minnequa,Colo. C10	9.50
Monessen,Pa. P7, P16	9.30
NewHaven,Conn. A7	9.60
Palmer,Mass. W12	9.60
Pittsburg,Calif. C11	10.25
Portsmouth,O. P12	9.30
Roebling,N.J. R5	9.60
S.Chicago,Ill. R2	9.30
S.SanFrancisco C10	10.25
SparrowsPt.,Md. B2	9.40
Struthers,O. Y1	9.30
Trenton,N.J. A7	9.60
Waukegan,Ill. A7	9.30
Worcester,Mass. A7	9.60

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5	9.30
Alton,Ill. L1	9.50
Bartonville,Ill. K4	9.40
Buffalo W12	9.30
Cleveland A7	9.30
Donora,Pa. A7	9.30
Duluth A7	9.30
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.30
KansasCity,Mo. S5	9.55
LosAngeles B3	10.25
Milbury,Mass.(12) N6	9.60
Minnequa,Colo. C10	9.50
Monessen,Pa. P7, P16	9.30
Muncie,Ind. I-7	9.50
Palmer,Mass.(12) W12	9.60
Pittsburg,Calif. C11	10.25
Portsmouth,O. P12	9.30
Roebling,N.J. R5	9.60
S.Chicago,Ill. R2	9.30
S.SanFrancisco C10	10.25
SparrowsPt.,Md. B2	9.40
Struthers,O. Y1	9.30
Trenton,N.J. A7	9.60
Waukegan,Ill. A7	9.30
Worcester,A7, J4, T6	9.60

WIRE, Fine & Weaving(8" Coils)	
Alton,Ill. L1	15.80
Bartonville,Ill. K4	15.70
Buffalo W12	15.60
Chicago W13	15.60
Cleveland A7	15.60
Crawfordsville,Ind. M8	15.70
Fostoria,O. S1	15.60
Houston S5	15.85
Jacksonville,Fla. M8	15.95
Johnstown,Pa. B2	15.60
KansasCity,Mo. S5	15.85
Kokomo,Ind. C16	15.60
Minnequa,Colo. C10	15.85
Monessen,Pa. P7, P16.	15.60
Muncie,Ind. I-7	15.80
Palmer,Mass. W12	15.90
S.SanFrancisco C10	16.45
Waukegan,Ill. A7	15.60
Worcester,Mass. A7, T6	15.90

ROPE WIRE	
Bartonville,Ill. K4	12.75
Buffalo W12	12.75
Fostoria,O. S1	12.75
Johnstown,Pa. B2	12.75
Monessen,Pa. P7	12.75
Muncie,Ind. I-7	12.95
Palmer,Mass. W12	13.05
Portsmouth,O. P12	12.75
Roebling,N.J. R5	13.05
SparrowsPt.,Md. B2	12.85
Struthers,O. Y1	12.75
Worcester,Mass. J4	13.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

Bartonville,Ill. K4	....16.55
Monessen,Pa. P16	....16.55
Roebling,N.J. R5	....17.05

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	.....11.65
Baltimore T6	.....11.95
Boston T6	.....11.95
Buffalo W12	.....11.65
Chicago W13	.....11.75
Cleveland A7	.....11.65
Crawfordsville,Ind. M8	.11.65
Dover,O. G6	.....11.65
Fostoria,O. S1	.....11.65
FranklinPark,Ill. T6	..11.75
Kokomo,Ind. C16	....11.65
Massillon,O. R8	.....11.65
Milwaukee C23	.....11.85
Monessen,Pa. P7, P16	..11.65
Palmer,Mass. W12	....11.95
Pawtucket,R.I. N8	....11.95
Philadelphia P24	.....11.95
Riverdale,Ill. A1	.....11.75
Rome,N.Y. R6	.....11.65
Sharon,Pa. S3	.....11.65
Trenton,N.J. R5	.....11.95
Warren,O. B9	.....11.65
Worcester,Mass. A7, T6	11.95

NAILS, Stock — **Col.**

AlabamaCity,Ala. R2	..173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville, Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	..175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla.(20) M8	.184
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	....$9.10

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	..$9.80
Wheeling,W.Va. W10	...9.80

POLISHED STAPLES — **Col.**

AlabamaCity,Ala. R2	...175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind M8	..177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla.(20) M8	186
Johnstown,Pa. B2	175
Joliet,Ill. A7	175
Kokomo,Ind. C6	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	.$10.26
Atlanta A11	.....10.36
Bartonville,Ill. K4	....10.36
Buffalo W12	.....10.26
Chicago W13	.....10.26
Crawfordsville,Ind. M8	.10.36
Donora,Pa. A7	.....10.26
Duluth A7	.....10.26
Fairfield,Ala T2	.....10.26
Houston S5	.....10.51
Jacksonville,Fla. M8	...10.82
Johnstown,Pa. B2	.....10.26
Joliet,Ill. A7	.....10.26
KansasCity,Mo. S5	.....10.51
Kokomo,Ind. C16	.....10.36
LosAngeles B3	.....11.05
Minnequa,Colo. C10	....10.51
Pittsburg,Calif. C11	....11.04
S.Chicago,Ill. R2	.....10.26
S.SanFrancisco C10	....11.04
SparrowsPt.,Md. B2	....10.36
Sterling,Ill.(37) N15	..10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	.$10.60
Atlanta A11	.....10.70
Bartonville,Ill. K4	....10.70
Buffalo W12	.....10.60
Chicago W13	.....10.60
Crawfordsville,Ind. M8	.10.70
Donora,Pa. A7	.....10.60
Duluth A7	.....10.60
Fairfield,Ala T2	.....10.60
Houston S5	.....10.85
Jacksonville,Fla. M8	..11.16
Johnstown,Pa. B2	....10.60
Joliet, Ill. A7	.....10.60
KansasCity,Mo. S5	....10.85
Kokomo,Ind. C16	.....10.70
LosAngeles B3	.....11.40
Minnequa,Colo. C10	..10.85
Pittsburg,Calif. C11	..11.40
S.Chicago,Ill. R2	.....10.60
S. SanFrancisco C10	..11.40
SparrowsPt., Md. B2	..10.70
Sterling,Ill.(37) N15	..10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	..$10.65
Atlanta A11	.....10.75
Bartonville,Ill. K4	....10.75
Buffalo W12	.....10.65
Chicago W13	.....10.65
Crawfordsville,Ind. M8	.10.75
Donora,Pa. A7	.....10.65
Duluth A7	.....10.65
Fairfield,Ala. T2	.....10.65
Houston S5	.....10.90
Jacksonville,Fla. M8	....11.21
Johnstown,Pa. B2	.....10.65
Joliet,Ill. A7	.....10.65
KansasCity,Mo. S5	....10.90
Kokomo,Ind. C16	.....10.75
LosAngeles B3	.....11.45
Minnequa,Colo. C10	....10.90
Pittsburg,Calif. C11	....11.45
S.Chicago,Ill. R2	.....10.65
S.SanFrancisco C10	....11.45
SparrowsPt.,Md. B2	....10.75
Sterling,Ill(37) N15	....10.75

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	..212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	..214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	219
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg, Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md B2	214
Sterling,Ill.(7) N15	214
Williamsport,Pa. S19	175

FENCE POSTS

Birmingham C15	171
ChicagoHts.,Ill. C2, I-2	..172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. C15	..171
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	172
Tonawanda,N.Y. B12	..174

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	..193**
Aliquippa,Pa. J5	.....190§
Atlanta A11	.....198*
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	..198
Donora,Pa. A7	.....193†
Duluth A7	.....193†
Fairfield,Ala. T2	.....193†
Houston S5	.....198**
Jacksonville,Fla. M8	203
Johnstown,Pa. B2	.....196§
Joliet,Ill. A7	.....193†
KansasCity,Mo. S5	....198**
Kokomo,Ind. C16	.....195†
Minnequa,Colo. C10	....198**
Monessen,Pa. P7	.....196*
Pittsburg,Calif. C11	....213†
Rankin,Pa. A7	.....193†
S.Chicago,Ill. R2	.....193**
S.SanFrancisco C10	....213**
SparrowsPoint,Md. B2	..198§
Sterling,Ill.(7) N15	.....198§

WOVEN FENCE, 9-15 Ga. — **Col.**

Ala.City,Ala. R2	....187**
Aliq'ppa,Pa.9-14½ga.J5	190§
Atlanta A11	.....192*
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	..192
Donora,Pa. A7	.....187†
Duluth A7	.....187†
Fairfield,Ala. T2	.....187†
Houston S5	.....192**
Jacksonville,Fla. M8	197
Johnstown,Pa.(43) B2	..190§
Joliet,Ill. A7	.....187†
KansasCity,Mo. S5	....192**
Kokomo,Ind. C16	.....189†
Minnequa,Colo. C10	....192**
Pittsburg,Calif. C11	....210†
Rankin,Pa. A7	.....187†
S.Chicago,Ill. R2	.....187**
Sterling,Ill.(7) N15	....192§

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa. J5	.17.15	18.95
Bartonville K4	..17.25	19.05
Cleveland A7	...17.15	....
Crawf'dsville M8	17.25	19.05
Fostoria,O. S1	..17.65	19.20†
Houston S5	... 17.40	18.95**
Jacksonville M8	17.50	19.30
Johnstown B2	..17.15	18.95§
Kan.City,Mo. S5	17.40	....
Kokomo C16	..17.25	18.80†
Minnequa C10	..17.40	18.95**
P'lm'r,Mass.W12	17.45	19.00†
Pitts.,Calif. C11	17.50	19.05†
SparrowsPt.	B2..17.25	19.05§
Sterling(37)N15	..17.25	19.05§
Waukegan A7	..17.15	18.70†
Worcester A7	..17.45	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala.	R2..8.65	9.20**
Aliquippa J5	....8.65	9.325§
Atlanta(48) A11	..8.75	9.425*
Bartonville(48) K4	8.75	9.425
Buffalo W12	....8.65	9.20†
Cleveland A7	....8.65	....
Crawfordsville M8	8.75	9.425
Donora,Pa. A7	..8.65	9.20†
Duluth A7	.....8.65	9.20†
Fairfield T2	.....8.65	9.20†
Houston(48) S5	...8.90	9.45**
Jacks'ville,Fla. M8	9.00	9.675
Johnstown B2(48)	8.65	9.325§
Joliet,Ill. A7	....8.65	9.20†
Kans.City(48) S5	8.90	9.45**
Kokomo C16	....8.75	9.30†
LosAngeles B3	..9.60	10.275§
Minnequa C10	..8.90	9.45**
Monessen P7(48)	..8.65	9.25*
Palmer,Mass. W12	8.95	9.50†
Pitts.,Calif. C11	..9.60	10.15†
Rankin,Pa. A7	..8.65	9.20†
S.Chicago R2	..8.65	9.20**
S.SanFran. C10	..9.60	10.15**
Spar'wsPt.B2(48)	8.75	9.425§
Sterling(48) N15	.8.90	9.575§
Sterling(1)(48)	..8.80	9.475§
Struthers,O.(48)Y1	8.65	9.30†
Worcester,Mass.A7	8.95	9.50†

Based on zinc price of: *13.50. †5c. §10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)
½ in. and smaller:

6 in. and shorter	49.0
Longer than 6 in.	39.0

⅝ in. thru 1 in.:

6 in. and shorter	39.0
Longer than 6 in.	35.0

1⅛ in. and larger:

All lengths	35.0

Undersized Body (rolled thread)
½ in. and smaller:

6 in. and shorter	49.0

Carriage, Machine, Lag Bolts
Hot Galvanized:
½ in. and smaller:

6 in. and shorter	29.0
Longer than 6 in.	15.0

⅝ in. and larger:

All lengths	12.0

Lag Bolts (all diam.)

6 in. and shorter	49.0
Longer than 6 in.	39.0

Plow and Tap Bolts
½ in. and smaller by 6 in. and shorter 49.0
Larger than ½ in. or Longer than 6 in. 39.0
Blank Bolts 39.0
Step, Elevator, Tire Bolts 49.0
Stove Bolts, Slotted:
¼ to ¼ in. incl.,

3 in. and shorter	55.0

⅝ to ½ in., inclusive 55.0

NUTS

Reg. & Heavy Square Nuts:

All sizes	55.5

Square Nuts, Reg. & Heavy, Hot Galvanized:

All sizes	41.0

Hex Nuts, Reg. & Heavy, Hot Pressed:

¾ in. and smaller	60.5
⅞ in. to 1 in., incl.	55.5
1⅛ in. to 1½ in., incl.	58.5
1⅝ in. and larger	53.5

Hex Nuts, Reg. & Heavy, Cold Punched:

¾ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5

Hex Nuts, All Types, Hot Galvanized:

¾ in. and smaller	46.5
⅞ in. to 1 in., incl.	41.5
1⅛ in. to 1½ in., incl.	46.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	60.5
¾ in. to 1 in., incl.	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:
6 in. and shorter:

⅝ in. and smaller	40.0
¾, ⅞, and 1 in. diam.	22.0
Longer than 6 in.:	
⅝ in. and smaller	8.0
¾, ⅞, and 1 in. diam.	+6.0

High Carbon, Heat Treated:
6 in. and shorter:

⅝ in. and smaller	26.0
¾, ⅞, and 1 in. diam.	3.0

Longer than 6 in.:

⅝ in. and smaller	+13.0
¾, ⅞, and 1 in. diam.	+32.0

Flat Head Capscrews:

¾ in. and smaller	+76.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:

6 in. and shorter	Net
Longer than 6 in.	+23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½ in. larger 12.25
⅞ in. under: List less 19%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
.....	13	....	25.98	23.54
1¼	13	....	30.78	23.36
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.05	34.20
2¼	13	43.29	50.75	38.52
2½	12	46.99	55.06	41.81
2¾	12	51.76	60.65	46.05
3	12	56.04	65.67	49.88
.....	12	59.76	70.03	53.19

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Gary,Ind. U5	5.525	5.425	....	....
Huntington,W.Va. C15	....	....	....	6.50
Indiana Harbor,Ind. I-2	5.525	5.425	5.475	....
Johnstown,Pa. B2	....	....	...(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	....
Williamsport,Pa. S19	....	....	....	6.50

TIE PLATES

Fairfield,Ala. T2	.....6.60
Gary,Ind. U5	.....6.60
Ind.Harbor,Ind. I-2	....6.60
Lackawanna,N.Y. B2	..6.60
Minnequa,Colo. C10	....6.60
Seattle B3	.....6.75
Steelton,Pa. B2	.....6.60
Torrance,Calif. C11	....6.75

JOINT BARS

Bessemer,Pa. U5	.....6.975
Fairfield,Ala. T2	.....6.975
Ind.Harbor,Ind. I-2	...6.975
Joliet,Ill. U5	.....6.975
Lackawanna,N.Y. B2	..6.975
Minnequa,Colo. C10	...6.975
Steelton,Pa. B2	.....6.975

AXLES

Ind.Harbor,Ind. S13	...8.775
Johnstown,Pa. B2	....8.775

TRACK BOLTS, Untreated

Cleveland R2	.....14.75
KansasCity,Mo. S5	....14.75
Lebanon,Pa. B2	.....14.75
Minnequa,Colo. C10	....14.75
Pittsburgh P14	.....14.75
Seattle B3	.....15.25

SCREW SPIKES

Lebanon,Pa. B2	.....14.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	.....9.75
Ind.Harbor,Ind. I-2, Y1	9.75
KansasCity,Mo. S5	....9.75
Lebanon,Pa. B2	.....9.75
Minnequa,Colo. C10	....9.75
Pittsburgh J5	.....9.75
Seattle B3	.....10.25
S.Chicago,Ill. R2	.....9.75
Struthers,O. Y1	.....9.75
Youngstown R2	.....9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 13 Ga. and heavier.
(9) Merchant quality; and 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.60c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 1¼ Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(45) 0.022 in. and lighter, over 0.022", 8.20c.
(48) 6-7Ga.
(49) 3½ in. and smaller rounds; 9.30c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	3.5	+23	+8.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+30	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis)

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	....	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	43.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	....	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.50	55.50
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	....	....	86.50	....	92.75	....	104.50
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	81.50	81.50
316 L	....	....	70.00	76.50	77.00	80.75	84.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
330	....	....	106.75	....	106.75	106.75	105.50	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	55.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.25	48.25	48.25
420	....	33.50	34.25	41.75	39.25	41.25	45.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co., Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels Inc.; U. S. Steel Corp.; Universal-Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel Co., subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	40.00
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.40	49.50	54.50	58.75
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.95	40.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.305	Cr-Hot Work	0.475
Extra Carbon	0.360	W-Cr Hot Work	0.500
Special Carbon	0.475	V-Cr Hot Work	0.520
Oil Hardening	0.475	Hi-Carbon-Cr	0.925

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.285
18.25	4.25	1	4.75	....	2.500
18	4	2	9	....	2.870
18	4	2	....	....	1.960
18	4	1	....	....	1.795
9	3.5	....	....	....	1.395
13.5	4	3	....	....	2.060
13.75	3.75	2	5	....	2.440
6.4	4.5	1.9	....	5	1.300
6	4	3	....	6	1.545
1.5	4	1	....	8.5	1.155

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
AlabamaCity,Ala. R2	62.00	62.50	....	....
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	....	66.50	....
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.62	69.12	69.12	69.62
Muskegon,Mich., deld.	....	74.12	74.12	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.5b
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.10	75.60	....
Newark,N.J., deld.	72.29	72.79	73.29	73.79
Philadelphia, deld.	70.01	70.51	71.01	71.59
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield,Ohio, deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry, $9 freight alowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Troy,N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	82.27
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents: Atlanta, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††		Carbon	Floor
Atlanta	8.59§	9.86§	....	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.61	....	8.76	9.06	11.34 #	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	11.07	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.38	10.44	11.45	53.50	9.42	9.73	12.90 #	15.28	9.63	9.72	11.20
Buffalo	8.40	9.00	10.07	55.98	8.50	8.80	10.90 #	15.00	8.90	8.90	10.45
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.20	9.45	10.00	53.00	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.05	52.43	8.54	8.92	9.31	14.96	9.18	8.93	10.21
Cleveland	8.18	9.45	9.95	55.68	8.33	8.69	10.80 #	14.74	9.01	8.79	10.11
Dallas	8.85	10.15	....	....	9.00	8.95	11.01	....	9.00	9.45	10.70
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.08
Detroit	8.43	9.70	10.35	56.50	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	8.45	9.75	8.45	....	8.60	8.55	11.10	....	8.60	9.05	10.30
Jackson, Miss.	8.52	9.79	....	....	8.57	8.94	10.68	....	8.97	8.90	10.74
Los Angeles	7.85	10.75	11.65	57.60	7.90	7.90	12.10	....	7.95	7.90	10.05
Milwaukee	8.33	9.58	10.13	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.35	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	53.08	9.31	9.57	12.76 #	15.09	9.35	9.43	10.71
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.00	8.90	9.87	51.94	8.69	8.65	11.51 #	15.01	8.50	8.77	9.77**
Pittsburgh	8.18	9.45	10.35	52.00	8.33	8.60	10.80 #	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.38	9.55	8.65	14.65 #	15.95	8.65	8.30	11.50
Richmond, Va.	8.45	....	10.40	....	9.15	9.15	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.36	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.61	....	8.84	9.21	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	11.00	55.10	9.45	9.70	13.00	16.10	9.50	9.60	12.00
Seattle	9.95	11.15	12.00	57.38	10.00	10.10	14.05	16.35	9.80	9.70	12.10
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	9.95	11.15	12.00	57.38	10.00	10.10	14.05	17.20	9.80	9.70	12.10
Washington	8.48	9.58	....	....	9.06	9.15	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.; #1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; [8]—400 to 9999 lb; [9]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $150; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $33-34; Mexican, all rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi River, ocean bags 23,000 lb and over.. F.o.b. Riverton or Camden, N. J., west of Mississippi River.	10.50 9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over F.o.b. Riverton, N. J., west of Mississippi River	10.50 9.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ¼ in. x 1.3 in.	28.00
Annealed, 99.5% Fe..	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500 lb drum, freight allowed Carlots	39.50
Ton lots	41.50
Antimony, 500 lb lots	42.00*
Brass, 5000-lb lots	31.30-38.40†
Bronze, 5000-lb lots	48.10-52.70†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.065
Nickel-Silver, 5000-lb lots	49.20-61.30†
Phosphor-Copper, 5000-lb lots	59.80
Copper (atomized) 5000-lb lots	40.30-48.80‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.02
Stainless Steel, 316	$1.20
Tin	14.50*
Zinc, 5000-lb lots	17.50-30.70‡
Tungsten: Melting grade, 99% 60 to 200 mesh: 1000 lb and over.. Less than 1000 lb	Dollars 3.15 3.30
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam	Length	Per 100 lb
2	24	$60.75
2½	30	39.25
3	40	37.00
4	40	35.00
5⅛	40	34.75
6	60	31.50
7	60	28.25
8, 9, 10	60	28.00
12	72	26.75
14	60	26.75
16	72	25.75
17	60	26.25
18	72	26.25
20	72	25.25
24	84	26.00

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$6.28	$6.23	$6.23	$6.48
Bar Size Angles	6.62	6.57	6.57	6.75
Structural Angles	6.62	6.57	6.57	6.75
I-Beams	6.87	6.82	6.82	7.00
Channels	6.87	6.82	6.82	7.00
Plates (basic bessemer)	8.35	8.30	8.30	8.60
Sheets, H.R.	8.25	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.79	26.67	26.67	27.36
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.87	6.82	6.82	7.22
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails ($)	8.38	8.38	8.38	8.58

†Per 82 lb. net, reel. §Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	28.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$13.00-14.00*
Domestic, concentrates f.o.b. milling points	20.00-22.00

*Before duty.

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.39-1.42 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; other than Indian, nominal; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$51.00-53.00
48% 2.8:1	48.00-50.00
48% no ratio	41.00-43.00

South African Transvaal

48% no ratio	$40.00-41.00
44% no ratio	30.00-30.50

Turkish

48% 3:1	$55.00-57.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	$2.50-2.60
60-65%	2.60-2.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.25
Saginaw, Mich., deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens: New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, Ohio, ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Neville Island (Pittsburgh), Pa., ovens	29.25
Painesville, Ohio, ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
St. Paul, ovens	29.75
Chicago, deld.	33.24
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.85 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	29.50
Industrial xylene	32.00-34.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00-34.00

Cents per pound, producing point

Phenol: Grade 1, 17.50; Grade 2-3, 15.50; Grade 4, 17.50; Grade 5, 16.50; Grade 6, 14.50.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton: $245, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered, Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.

Cr 67.71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 30.05c per lb of contained Cr. Packed, c.l. 31.65c, ton 33.45c, less ton 34.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 21.25c, per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 27.5c per lb contained Cr, 14.20c per lb contained Si. 0.75" x down, 28.65c per lb contained Cr, 14.20c per lb contained Si. Delivered.

Chromium Metal Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less carload lot, packed $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 14.20c per lb of contained Si. Packed c.l. 16.70c, ton lot 18.15c, less ton 19.80c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 22.00c per lb of Si. Packed, c.l. 23.65c, ton lot 24.95c, less ton 25.95c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy; ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (1 to 2%). Contract, lump, carload 9.50c, per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅛ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, carload packed in box pallets 19.80c, in bags 20.70c; 3000 lb to c.l. in box pallets 21.00c; 2000 lb to c.l. in bags, 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot 2" x D, $4.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $4.30.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5.7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Sigio, Tenn., $110 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa. $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

(*Concluded from Page* 144)

280 tons, switchyard and structures, Swift hydroelectric project, Lewis River, Wash.; bids Jan. 14 to Cowlitz County P.U.D., Longview, Wash.; Bechtel Corp., planning engineer.

115 tons, also unstated piling tonnage, Glacier Highway bridge, Alaska; bids to Bureau of Public Roads, Juneau, Alaska, Dec. 20.

100 tons, grain elevator, Packard, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; E. R. Haynes Co., Spokane, Wash., general contractor.

84 tons, Lake Kechelus Bridge, Wash., Bethlehem Pacific Coast Steel Corp., Seattle; Hans Skov, subcontractor.

Unstated, 698-ft Montana bridge, Kootenai River, Lincoln County; bids to Helena, Mont., Dec. 19.

PLATES . . .

PLATES PENDING

150 tons, 400,000-gal-elevated water tank, veterans' hospital, St. Cloud, Minn.; bids Jan. 21, Washington, D. C.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Northern Pacific, 58 diesel units, including 31 road switchers (1750-hp capacity), 15 switchers (1200-hp), to Electro-Motive Div., General Motors Corp., La Grange, Ill., and 12 road switchers (1800-hp), to Alco Products Inc., New York.

Duluth, Mesabi & Iron Range, 28 road switchers (1750-hp), to Electro-Motive Div., General Motors Corp., La Grange, Ill.

The Paulista Railroad, Brazil, 10 diesel electric (990-hp capacity), to General Electric Co., Erie, Pa.

RAILROAD CARS PLACED

Detroit & Mackinac, 25 seventy-ton hoppers, to General American Transportation Co., Chicago.

Bessemer & Lake Erie, flat cars (one 125-ton and one 135-ton), to Thrall Car Mfg. Co., Chicago.

Canadian Pacific, 475 triple hoppers, to National Steel Car Co., Canada.

Georgia, 75 seventy-ton hoppers, to American Car & Foundry Co., New York.

Western of Alabama, 25 seventy-ton hoppers, to American Car & Foundry Co., New York.

Midland Properties Co. (Savannah & Atlanta), five 50-ton boxcars, to Pullman-Standard Car Mfg. Co., Chicago.

Illinois Central, 100 seventy-ton twin hoppers, and 100 seventy-ton triple hoppers, to American Car & Foundry Co., New York.

Northern Pacific, 10 passenger train baggage cars, to Pullman-Standard Car Mfg. Co., Chicago.

REINFORCING BARS . . .

REINFORCING BARS PLACED

700 tons, library and administration building, Hunter College, New York, to Fabricators Steel Corp., New York; Leon D. DeMatteis Construction Co., Elmont, N. Y., general contractor.

535 tons, state service building, Denver, Colo., to Kansas City Supply Co., Denver; Mead & Mount Construction Co., Denver, general contractor.

500 tons, shop building, Walworth Co., Braintree, Mass., to Northern Steel Inc., Medford, Mass.; George A. Fuller Co., Boston, general contractor.

400 tons, viaduct, Lackawanna-Buffalo, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; Bero Construction Co., Waterloo, N. Y., general contractor.

100 tons or more, Eli Whitney Regional Technical High School, Hamden, Conn., to Joseph T. Ryerson & Sons Inc., Boston; P. Francini & Co. Inc., Derby, Conn., general contractor; structurals, John Adler-hurst Iron Works Inc., New Haven, Conn.

REINFORCING BARS PENDING

1800 tons, Exchange Building addition and garage, Seattle; bids probably in January.

820 tons, footings, etc., for 315-mile transmission line, from Ft. Peck, Mont., dam; bids to be invited soon by U. S. Bureau of Reclamation, Ft. Peck.

180 tons, box girder bridge, Pierce County, Wash.; Quality Builders Inc., Tacoma, Wash., low at $140,873.

155 tons, two state bridges, Collinsville, Conn.; bids Dec. 16, Hartford, Conn.; also 55 tons of structural steel.

135 tons, two state bridges, Interstate Route 3, Hopkinton, N. H.; bids in.

95 tons, four highway bridges, Yakima County, Wash.; C. E. Oneal Inc., Ellensburg, Wash., awarded general contract at $679,611.

95 tons, box girder bridge, King County, Wash.; general contract to A. R. Anderson, Seattle, low at $77,627.

Unstated, Montana 462-ft overpass, Powell County; bids to Helena, Mont., Dec. 19.

Iron Ore Statistics for October, 1957

RECEIPTS OF IRON ORE & ORE AGGLOMERATES
(Gross tons; original sources)

Receipts	U. S. Ores		Canadian Ores		Other Foreign	Total Tonnages
	L. Superior	Other	L. Superior	Other		
MONTHLY:						
U. S.	10,570,530	1,764,760	343,214	1,545,498	2,052,318	16,276,320
Canada	377,809	.....	95,859	226,030	46,968	746,666
Total U. S. & Canada	10,948,339	1,764,760	439,073	1,771,528	2,099,286	17,022,986
Year To Date						
U. S.	73,578,571	17,296,249	2,602,753	8,077,766	18,379,125	119,934,464
Canada	3,698,143	.....	645,354	1,230,344	245,242	5,819,083
Total U. S. & Canada	77,276,714	17,296,249	3,248,107	9,308,110	18,624,367	125,753,547

STOCKS OF IRON ORE ON HAND AT END OF OCTOBER
(Gross tons; original sources)

At U. S. furnaces	U. S. Ores		Canadian Ores		Other Foreign Ores	Total Tonnages
	L. Superior	Other	L. Superior	Other		
DISTRICT:						
Eastern	6,452,372	239,816	372,186	2,429,911	2,710,802	12,205,087
Pittsburgh-Youngstown	13,875,400	81,643	766,537	3,011,698	3,159,150	20,894,428
Cleveland-Detroit	10,715,212	108,033	564,156	339,404	129,412	11,856,217
Chicago	14,580,092	(a)	(a)	.....	(a)	14,580,092
Southern	(a)	2,130,589	.....	(a)	1,034,691	3,165,280
Western	.....	855,637	.....	.....	.....	855,637
Total at furnaces	45,623,076	3,415,718	1,702,879	5,781,013	7,034,055	63,556,741
AT U. S. DOCKS:						
Lake Erie	4,555,657	.....	113,505	219,008	.....	4,888,170
Other U. S.	.....	.....	.....	(a)	(a)	(a)
Total U. S. Docks	4,555,657	.....	113,505	219,008	(a)	4,888,170
Total U. S. Stocks	50,178,733	3,415,718	1,816,384	6,000,021	7,034,055	68,444,911
CANADIAN						
Furnace Yards	2,792,001	.....	56,493	626,141	144,255	3,618,890
Total U. S. & Canada	52,970,734	3,415,718	1,872,877	6,626,162	7,178,310	72,063,801

CONSUMPTION OF IRON ORE & ORE AGGLOMERATES
(Gross tons; original sources)

Consumption	U. S. Ores		Canadian Ores		Foreign Ores	Total Tonnages
	L. Superior	Other	L. Superior	Other		
U. S. Districts:						
Eastern	869,836	252,966	66,740	278,837	887,495	2,355,874
Pittsburgh-Youngstown	2,017,092	132,443	67,740	398,840	515,202	3,131,317
Cleveland-Detroit	1,143,435	62,980	72,454	58,204	91,222	1,428,295
Chicago	1,951,924	(a)	(a)	.....	(a)	1,951,924
Southern	(a)	602,317	.....	(a)	201,238	803,555
Western	.....	601,487	.....	.....	.....	601,487
IN U. S.:						
Blast furnaces	5,149,472	1,115,490	175,062	466,869	709,991	7,616,884
Steel furnaces	203,898	97,438	284	6,625	444,075	752,320
Agglomerating plants	628,829	438,869	31,475	258,310	531,662	1,889,145
Miscellaneous	88	396	113	4,077	9,429	14,103
Total U. S. (Monthly)	5,982,287	1,652,193	206,934	735,881	1,695,157	10,272,452
IN CANADA:						
Blast furnaces	184,671	.....	76,114	71,096	.....	331,881
Steel furnaces	3,865	.....	.....	3,482	13,213	20,560
Agglomerating plants	64,010	.....	20,021	17,290	2,890	104,211
Miscellaneous	25	.....	.....	.....	.....	25
Total Canada (Monthly)	252,571	.....	96,135	91,868	16,103	456,677
TOTAL U. S. & Canada	6,234,858	1,652,193	303,069	827,749	1,711,260	10,729,129
CONSUMPTION YEAR TO DATE:						
U. S.	64,999,021	16,927,119	2,659,637	6,978,381	6,088,671	107,652,829
Canada	3,251,556	.....	671,726	1,080,132	143,576	5,146,990
TOTAL CONSUMPTION	68,250,577	16,927,119	3,331,363	8,058,513	6,232,247	112,799,819

(a) Small tonnage included in other districts to avoid disclosure.
Data from American Iron Ore Association and American Iron & Steel Institute.

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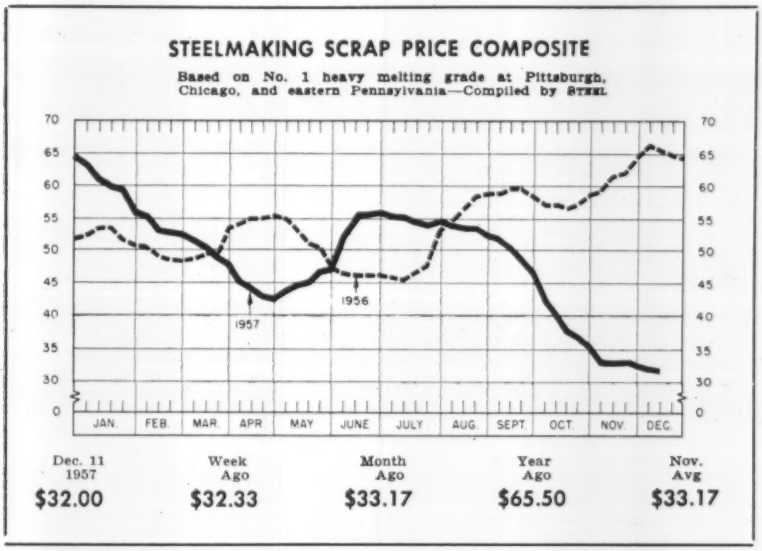

Pace of Scrap Decline Slows Down

Price slump continuing, with ingot operating rate still falling, but the drop is less sharp. STEEL's composite on the prime grade slips to $32, down 33 cents

Scrap Prices, Page 158

Chicago — Several steelmaking grades of scrap are off another $1 in a colorless market. Consumer buying is low, neither brokers nor dealers pushing for business. Scrap collectors are providing only a trickle of material.

Dealers hold moderate yard stocks. Steel mill inventories are three-fourths of capacity.

Foundry grades of scrap are listless. Most gray iron foundries are operating four days a week. They have backlogs of only two to three weeks.

Philadelphia—No. 1 bundles and No. 1 busheling have declined $1 a ton to the level of No. 1 heavy melting, $33.50. Structurals and plate, short rail crops, malleable and drop broken machinery are slightly easier.

Sales at current low prices are slow, and scrap is coming out sluggishly. Borings and turnings are not moving.

Buying for export is less active. Tonnage for two vessels now loading was covered some time ago.

New York—Borings and turnings are the dullest items in the steel scrap list. Buying of primary grades of heavy melting is slow, and scrap coming out is well under normal volume. No. 1 cupola cast has weakened; brokers are offering $34-$35, shipping point, a reduction of $4. Stainless 430 grade is slightly more active, and prices are firmer.

Pittsburgh — Mills have ample supplies of scrap. No pickup in ingot production or in scrap sales is expected before next quarter. The local scrap market will probably be dull until then. Latest railroad scrap lists showed a slight increase from earlier lists, with the gains greatest in rails.

Cleveland—Not much change in sluggish scrap market conditions is expected over the holidays. Trading will hit a low point during the next couple weeks. Local ingot operations are still tending downward—the current estimate is 68.5 per cent of capacity. Prices are largely nominal in the absence of representative buying.

Detroit—No buys are reported in the scrap market here. No. 1 bundles are quoted on a level with No. 1 heavy melting at $21-$22. The outlook continues to be pessimistic; most dealers and brokers feel there will be little change until after the turn of the year.

Cincinnati — Scrap is inactive here. Mills in the area are virtually out of the market, though some open hearth grades are moving. One local producer is down to one active electric furnace and is buying scrap sparingly. The foundries also are showing little interest. Some dealers are piling scrap.

Buffalo—The leading scrap consumer in this market failed to place December orders at the opening of the month, and indications are it will not buy until January. As a result, scrap prices have dropped another $1 a ton across the board. Some dealers think the decline will be extended another $1 before month's end.

St. Louis—Buying is at a low for the year. Prices are unchanged, but they are nominal. Shipments are light, especially from rural points. Railroad offerings are small. The Wabash last week withdrew an offering of 15,000 tons of No. 1 heavy melting because of low bids. Foundry operations are irregular, ranging from two to five days weekly.

Birmingham—There is still little activity in either the domestic or export markets for scrap in the Southeast.

A district foundry purchased No. 1 cupola cast scrap at $2 a ton above its last order in an apparent effort to get a better tonnage flow. Other cast iron buyers, though, did not follow suit.

San Francisco—Cast iron scrap prices have been reduced $2 to $4 a ton across the board here. Prices on the steel grades are holding unchanged.

Los Angeles—Seasonal slacken-

(*Please turn to Page* 163)

No matter for what reason you come to Baltimore, the chances are we're nearest to where you want to go.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Dec. 11, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Dec. 11	$32.00
Dec. 4	32.33
Nov. Avg.	33.17
Dec. 1956	64.29
Dec. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	29.00-30.00
No. 1 factory bundles	*34.00-35.00*
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	28.00-29.00
No. 1 busheling	31.00-32.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	*19.00-20.00*
Cast iron borings	*19.00-20.00*
Cut structurals:	
2 ft and under	35.00-36.00
3 ft lengths	34.00-35.00
Heavy turnings	30.00-31.00
Punchings & plate scrap	34.00-35.00
Electric furnace bundles	34.00-35.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Stove plate	33.00-34.00
Unstripped motor blocks	26.00-27.00
Clean auto cast	42.00-43.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00-37.00*
Rails, 2 ft and under	*55.00-56.00*
Rails, 18 in. and under	*56.00-57.00*
Angles, splice bars	46.00-47.00
Rails, rerolling	*56.00-57.00*

Stainless Steel Scrap

18-8 bundles & solids	210.00-215.00
18-8 turnings	115.00-120.00
430 bundles & solids	95.00-100.00
430 turnings	50.00-55.00

CLEVELAND

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	20.00-21.00
No. 1 factory bundles	29.00-30.00
No. 1 bundles	26.00-27.00
No. 2 bundles	19.00-20.00
No. 1 busheling	26.00-27.00
Machine shop turnings	11.00-12.00
Short shovel turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut foundry steel	33.00-34.00
Cut structurals, plates 2 ft and under	35.00-36.00
Low phos. punchings & plate	29.00-30.00
Alloy free, short shovel turnings	19.00-20.00
Electric furnace bundles	27.00-28.00

Cast Iron Grades*

No. 1 cupola	38.00-39.00
Charging box cast	33.00-34.00
Heavy breakable cast	29.00-30.00
Stove plate	36.00-37.00
Unstripped motor blocks	23.00-24.00
Brake shoes	30.00-31.00
Clean auto cast	42.00-43.00
Burnt cast	28.00-29.00
Drop broken machinery	40.00-41.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.50-32.50
R.R. malleable	49.00-50.00
Rails, 2 ft and under	55.00-56.00
Rails, 18 in. and under	56.00-57.00
Rails, random lengths	48.00-49.00
Cast steel	43.00-44.00
Railroad specialties	43.00-44.00
Uncut tires	37.00-38.00
Angles, splice bars	43.00-44.00
Rails, rerolling	54.00-55.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	205.00-210.00
18-8 turnings	90.00-95.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

*Nominal

YOUNGSTOWN

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	29.00-30.00
No. 2 bundles	22.00-23.00
No. 1 busheling	29.00-30.00
Machine shop turnings	13.00-14.00
Short shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	33.00-34.00
Electric furnace bundles	33.00-34.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.50-35.50

CHICAGO

No. 1 heavy melt., indus.	*32.00-33.00*
No. 1 hvy melt., dealer	*29.00-30.00*
No. 2 heavy melting	*28.00-29.00*
No. 1 factory bundles	35.00-36.00
No. 1 dealer bundles	*29.00-30.00*
No. 2 bundles	19.00-20.00
No. 1 busheling, indus.	*32.00-33.00*
No. 1 busheling, dealer	*29.00-30.00*
Machine shop turnings	16.00-17.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Cut structurals, 3 ft.	38.00-39.00
Punchings & plate scrap	39.00-40.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Stove plate	33.00-34.00
Unstripped motor blocks	27.00-28.00
Clean auto cast	39.00-40.00
Drop broken machinery	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
R.R. malleable	44.00-45.00
Rails, 2 ft and under	*47.00-48.00*
Rails, 18 in. and smaller	*48.00-49.00*
Angles, splice bars	*45.00-46.00*
Axles	47.00-48.00
Rails, rerolling	*47.00-48.00*

Stainless Steel Scrap

18-8 bundles & solids	*200.00-210.00*
18-8 turnings	*100.00-110.00*
430 turnings & solids	80.00-90.00
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	21.00-22.00
No. 2 heavy melting	18.00-19.00
No. 1 bundles	*21.00-22.00*
No. 2 bundles	18.00-19.00
No. 1 busheling	21.00-22.00
Machine shop turnings	8.00-9.00
Mixed borings, turnings	9.00-10.00
Short shovel turnings	10.00-11.00
Punchings & plate scrap	27.00-28.00

Cast Iron Grades

No. 1 cupola	31.00
Stove plate	25.00
Charging box cast	25.00
Heavy breakable	24.00
Unstripped motor blocks	15.00†
Clean auto cast	33.00
Malleable	34.00†

†Nominal

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	35.00
No. 2 heavy melting	32.00
No. 1 bundles	35.00
No. 2 bundles	25.00
No. 1 busheling	35.00
Machine shop turnings	15.00
Short shovel turnings	17.00†

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	35.00
Heavy breakable cast	35.00
Unstripped motor blocks	35.00
Brake shoes	40.00
Clean auto cast	43.00
Stove plate	37.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.25
Rails, 18 in. and under	49.00†
Rails, random lengths	43.00
Rails, rerolling	47.00†
Angles, splice bars	43.00†

†Nominal

PHILADELPHIA

No. 1 heavy melting	33.50
No. 2 heavy melting	30.50
No. 1 bundles	*33.50*
No. 2 bundles	24.50
No. 1 busheling	*33.50*
Electric furnace bundles	37.00
Mixed borings, turnings	22.50
Short shovel turnings	24.00
Machine shop turnings	22.00†
Heavy turnings	29.50
Structurals & plate	*40.00-41.00*
Couplers, springs, wheels	46.00
Rail crops, 2 ft & under	*62.00-64.00*

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	37.00
Malleable	*56.00*
Drop broken machinery	*49.00-50.00*

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	33.50
No. 2 heavy melting	29.00-30.00
No. 1 bundles	33.50
No. 2 bundles	21.00-22.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	*12.00-13.00*
Short shovel turnings	*14.00-15.00*
Low phos. (structurals & plate)	45.00-46.00

Cast Iron Grades

No. 1 cupola	*34.00-35.00*
Unstripped motor blocks	32.00
Heavy breakable	33.00-34.00

Stainless Steel

18-8 sheets, clips, solids	160.00-165.00
18-8 borings, turnings	55.00-60.00
410 sheets, clips, solids	60.00-65.00
430 sheets, clips, solids	*75.00-80.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	20.00-21.00
No. 1 bundles	23.00-24.00
No. 2 bundles	15.00-16.00
No. 1 busheling	*22.00-23.00*
Machine shop turnings	*9.50-10.00*
Mixed borings, turnings	*10.50-11.00*
Short shovel turnings	*11.00-11.50*
No. 1 cast	33.00-34.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	35.00-36.00

BUFFALO

No. 1 heavy melting	*31.00-32.00*
No. 2 heavy melting	*28.00-29.00*
No. 1 bundles	*31.00-32.00*
No. 2 bundles	27.00-28.00
No. 1 busheling	*31.00-32.00*
Mixed borings, turnings	*17.00-18.00*
Machine shop turnings	16.00-17.00
Short shovel turnings	*19.00-20.00*
Cast iron borings	*17.00-18.00*
Low phos.	*36.00-37.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*36.00-37.00*
No. 1 machinery	*41.00-42.00*

Railroad Scrap

Rails, random lengths	*43.00-44.00*
Rails, 3 ft and under	*50.00-51.00*
Railroad specialties	*36.00-37.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	29.00-30.00
No. 2 bundles	20.00-21.00
No. 1 busheling	29.00-30.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos. 18 in.	36.00-37.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Heavy breakable cast	32.00-33.00
Charging box cast	32.00-33.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt	33.00-34.00
Rails, 18 in. and under	54.00-55.00
Rails, random lengths	43.00-44.00

BIRMINGHAM

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*24.00-25.00*
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
No. 1 busheling	31.00-32.00
Cast iron borings	*11.00-12.00*
Short shovel turnings	21.00-22.00
Machine shop turnings	20.00-21.00
Bar crops and plates	38.00-39.00
Structurals & plate	38.00-39.00
Electric furnace bundles	35.00-36.00
Electric furnace:	
3 ft and under	33.00-34.00
2 ft and under	34.00-35.00

Cast Iron Grades

No. 1 cupola	*47.00-48.00*
Stove plate	*47.00-48.00*
Unstripped motor blocks	37.00-38.00
Charging box cast	22.00-23.00
No. 1 wheels	37.00-38.00

Railroad Scrap

No. 1, R.R. heavy melt.	34.00-35.00
Rails, 18 in. and under	46.00-47.00
Rails, rerolling	47.00-48.00
Rails, random lengths	40.00-41.00
Angles, splice bars	40.00-41.00

SEATTLE

No. 1 heavy melting	34.00†
No. 2 heavy melting	32.00†
No. 1 bundles	33.00†
No. 2 bundles	25.00†
Machine shop turnings	26.00†
Mixed borings, turnings	26.00†
Electric furnace No. 1	46.00

Cast Iron Grades

No. 1 cupola	35.00†
Heavy breakable cast	32.00†
Unstripped motor blocks	27.00†
Stove plate (f.o.b. plant	25.00†

†Nominal

LOS ANGELES

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	38.00
No. 2 bundles	30.00
Machine shop turnings	20.00
Shoveling turnings	25.00
Cast iron borings	25.00
Cut structurals and plate 1 ft and under	54.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	52.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	34.00
No. 2 bundles	26.00
Machine shop turnings	20.00
Mixed borings, turnings	20.00
Cast iron borings	20.00
Heavy turnings	20.00
Short shovel turnings	20.00
Cut structurals, 3 ft.	48.00

Cast Iron Grades

No. 1 cupola	*45.00*
Charging box cast	*38.00*
Stove plate	*36.00*
Heavy breakable cast	*34.00*
Unstripped motor blocks	*34.00*
Clean auto cast	*45.00*
No. 1 wheels	*36.00*
Drop broken machinery	*45.00*

HAMILTON, ONT.

No. 1 heavy melting	34.00
No. 2 heavy melting	29.00
No. 1 bundles	34.00
No. 2 bundles	24.00
Mixed steel scrap	29.00
Mixed borings, turnings	19.00
Busheling, new factory:	
Prepared	34.00
Unprepared	28.00
Short steel turnings	23.00
Rails, rerolling	42.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.

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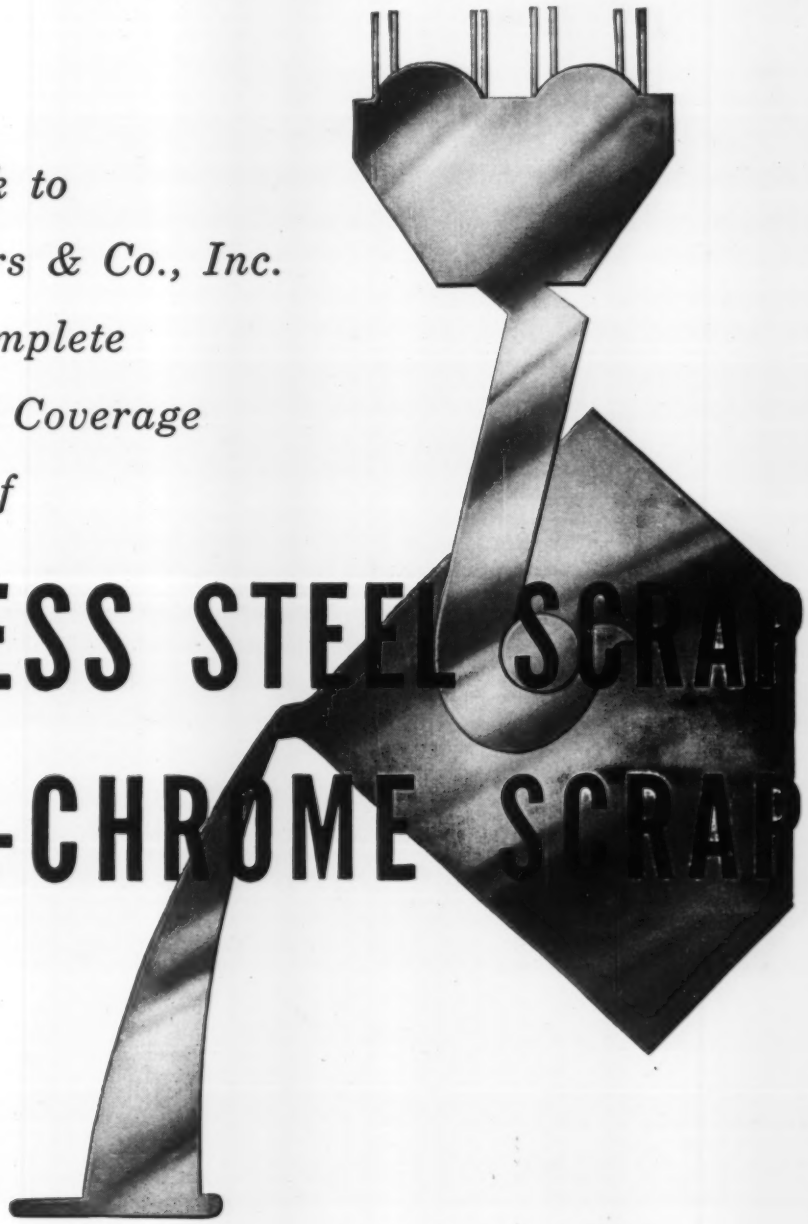

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Zinc Down in 1957

November shipments show improvement, but yearly figure will be substantially below 1956's. Titanium orders show a slight gain. Magnesium consumption off some

Nonferrous Metal Prices, Pages 162 & 163

NOVEMBER WILL probably be the best month of the year for the zinc industry.

Plusses—Domestic shipments of slab zinc in November hit 73,419 tons, the highest for any month in the year and a 7000-ton gain over October. Total shipments of 83,148 tons (including exports, drawback, and government purchases) were the highest since May.

November also saw reductions where they were most needed—in production and stocks on hand. At 79,754 tons, production was at its second lowest mark of the year, and 2000 tons below the October total. Stocks were reduced from October's 155,925 tons to 152,531 tons—the first time this year they showed a downturn.

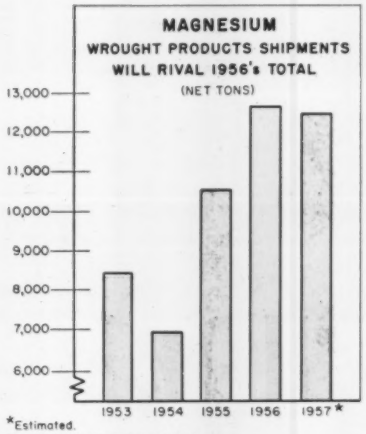
Minuses — Unfortunately, 1957 as a whole won't show up quite as good as November. Final tallies should place 1957 production at around 1,053,000 tons, just under the 1956 figure of 1,062,954 tons, and the second highest production year in history.

But shipments won't come close to the 1956 mark. Domestic shipments will probably hit about 765,000 tons this year, compared with 869,270 tons in 1956. Total shipments should be around 967,000 tons, a substantial dropoff from the 1,035,311 tons registered last year.

Present—The gains registered in November are not in evidence now. For the last several weeks, demand has been off. Slack demand, coupled with falling prices on the London Metal Exchange and the weakeness in lead, has made the domestic price vulnerable. It's now possible for foreign producers to bring zinc into the U. S. at prices substantially under domestic quotations.

Lead—Sales still plod along at disappointing levels. There are some reports of price cutting.

The 13 cent a pound price continues to be in jeopardy. Major reason: Falling quotations on the LME. Foreign origin lead can be sold in New York at more than 2 cents a pound under the domestic price.



*Estimated.
Source: Magnesium Association.

Copper—Demand ranges from "about the same" to a "little better," custom smelters report. Primary producers say sales are worse.

It's still a question whether primary and custom smelted prices will hold. Primary producers are beginning to say another reduction wouldn't bring in any more business and would only mean further cuts into profit margins. But no one is discounting the possibility that prices could fall.

Titanium: Slight Gain

Titanium producers report modest gains in sales (especially plates and tubes) to civilian consumers. There is at least one case of a substantial order for sheets from an aircraft manufacturer, although military orders continue to lag.

Because of the record breaking first half, production of mill products will still beat the 1956 figure of 5100 tons by about 10 per cent. But production slipped from 3828 tons in the first half to 1105 tons in the third quarter and probably won't exceed 700 to 750 tons in the fourth. Annual production should be around 5600 tons, a far cry from the 6800-ton figure predicted by the industry only a few months ago.

Magnesium: Off a Little

Total magnesium consumption in 1957 should hit 50,250 tons, says the Dow Chemical Co. This is about 3500 tons less than the 1956 total. A breakdown shows some 30,000 tons used in chemical and metallurgical applications and around 20,250 tons as structural metal.

The industry sees shipments of wrought products in 1957 at 12,500 tons (see chart), compared with 12,692 tons last year.

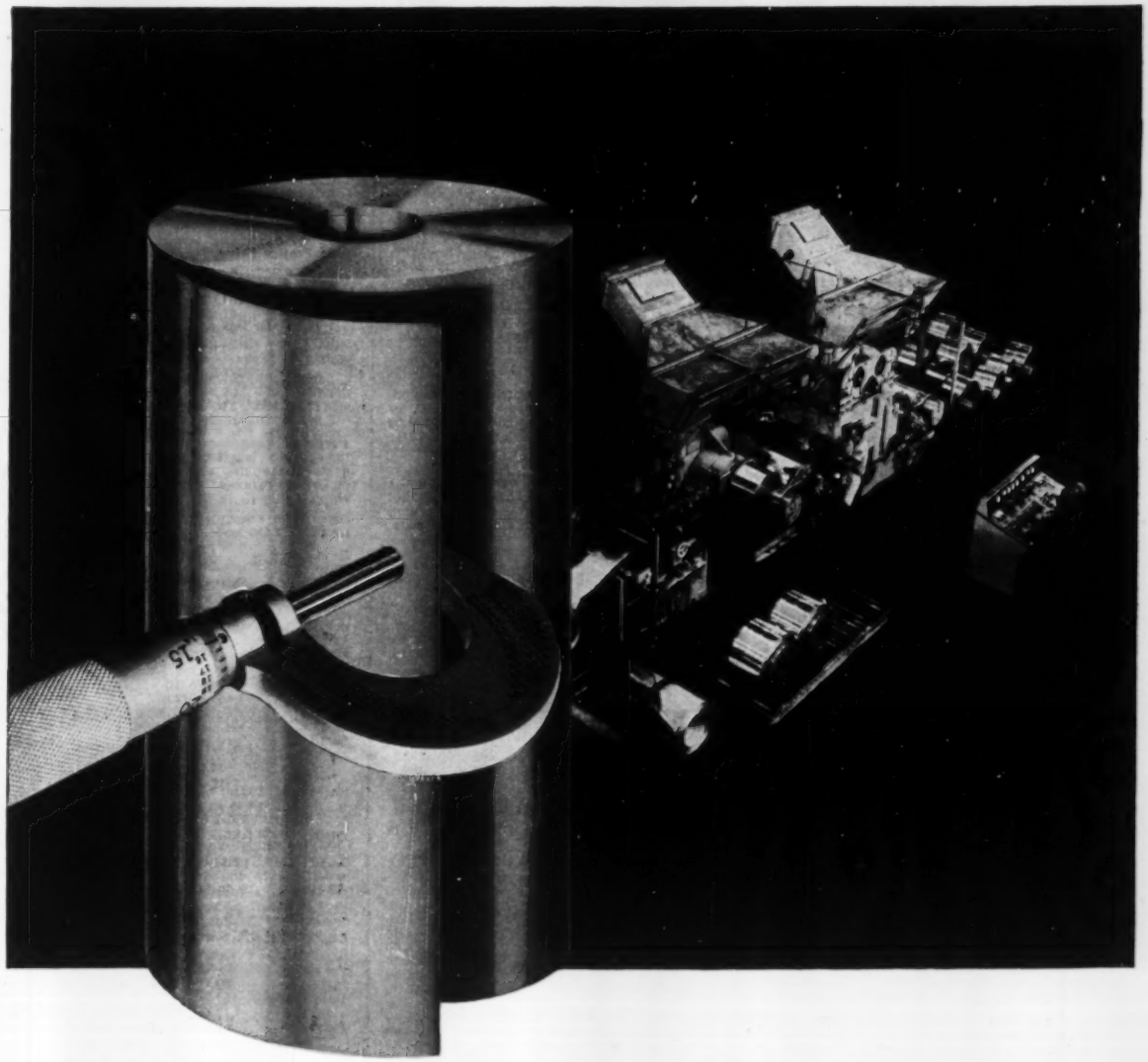
NONFERROUS PRICE RECORD

	Price Dec. 11	Last Change	Previous Price	Nov. Avg	Oct. Avg	Dec., 1956 Avg
Aluminum ..	26.00	Aug. 1, 1957	25.00	26.000	26.000	25.000
Copper	25.00-27.00	Nov. 21, 1957	25.50-27.00	26.217	26.361	35.650
Lead	12.80	Dec. 2, 1957	13.30	13.300	13.504	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	92.75	Dec. 11, 1957	92.625	89.288	91.843	105.067
Zinc	10.00	July 1, 1957	10.50	10.000	10.000	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.

When Brass Strip Tolerances Call For

PERFECTION TO THE "Nth" DEGREE



Possibly, you've never seen—or even heard of—a Sendzimir Rolling Mill like the one pictured above. Not many people have. But if you use close-tolerance brass, copper or bronze strip, you'll certainly appreciate what these high-speed, precision units can do when you order Bridgeport Sendzimir-Rolled Strip.

These mills—now in operation at Bridgeport's plants—are capable of rolling light-gauge strip into economical, long-length coils to meet the most rigid gauge tolerances.

Bridgeport Sendzimir-Rolled Strip has other advantages as well. It has remarkable uniformity of gauge and mechanical properties from edge to edge and end to end. It also has a beautiful luster—all properties you can use to advantage in your own production.

Get details on Bridgeport Sendzimir-Rolled Strip today. Our nearest Sales Office is ready to give you complete information.

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BRIDGEPORT BRASS

Offices in Principal Cities • Conveniently Located Warehouses
Bridgeport Brass Company, Bridgeport 2, Connecticut
In Canada: Noranda Copper and Brass Limited, Montreal

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 31.30; No. 241, 31.50; No. 356, 29.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.50-26.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per ton, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $120 per lb, nom.

Copper: Electrolytic, 27.00 deld.; custom smelters, 25.00; lake, 27.00 deld.; fire refined, 26.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $80-110 nom. per troy oz.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots, $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $223-230 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $80-100 per troy oz nom.

Palladium: $21-24 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.50 per lb, commercial grade.

Silver: Open market, 90.00 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 92.75.

Titanium: Sponge, 99.3+ %, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.50 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+ % hydrogen reduced, $4.10-4.20.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.00-25.50; No. 12 foundry alloy (No. 2 grade), 22.00-23.25; 5% silicon alloy, 0.60 Cu max., 25.75-26.25; 13 alloy, 0.60 Cu max., 25.75-26.25; 195 alloy, 25.00-27.00; 108 alloy, 22.50-23.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.00; grade 2, 22.25; grade 3, 21.00; grade 4, 19.00.

Brass Ingot: Red brass, No. 115, 27.25; tin bronze, No. 225, 36.00; No. 245, 30.75; high-leaded tin bronze, No. 305, 31.25; No. 1 yellow, No. 405, 22.75; manganese bronze, No. 421, 24.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.82, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 32.355; l.c.l., 32.98. Weatherproof, 30,000-lb lots, 33.66; l.c.l., 34.78. Magnet wire deld., 40.43, before quantity discounts.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 20.50; plates 19.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.00-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.136	43.10-47.60	.....
0.135-0.096	43.60-48.70	40.50-41.10
0.095-0.077	44.30-50.50	40.60-41.30
0.076-0.061	44.90-52.80	40.80-42.00
0.060-0.048	45.60-55.10	41.40-43.10
0.047-0.038	46.20-57.90	41.90-44.50
0.037-0.030	46.60-62.90	42.30-46.30
0.029-0.024	47.20-54.70	42.60-47.00
0.023-0.019	48.20-58.10	43.70-45.40
0.018-0.17	49.00-55.40	44.30-46.00
0.016-0.015	49.90-56.30	45.10-46.80
0.014	50.90	46.10-47.80
0.013-0.012	52.10	46.80
0.011	53.10	48.00
0.010-0.0095	54.60	49.40
0.009-0.0085	55.90	50.90
0.008-0.0075	57.50	52.10
0.007	59.00	53.60
0.006	60.60	55.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.70	47.50
5050-F	43.80	48.60
3004-F	44.80	50.50
5052-F	45.40	51.20
6061-T6	46.90	53.00
2024-T4*	50.60	57.40
7075-T6*	58.40	66.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam.(in.)or across flats	—Round— 2011-T3	2017-T4	—Hexagonal— 2011-T3	2017-T4
Drawn				
0.125	78.20	75.20	....	....
0.156-0.172	66.20	63.40	....	....
0.188	66.20	63.40	....	81.60
0.219-0.234	63.00	61.50	....	....
0.250-0.281	63.00	61.50	....	77.90
0.313	63.00	61.50	....	74.20
0.344	62.50	....	....	....
Cold-Finished				
0.375-0.547	62.50	61.30	74.80	69.80
0.563-0.688	62.50	61.30	71.10	65.50
0.719-1.000	61.00	59.70	64.90	61.70
1.063	61.00	59.70	....	59.60
1.125-1.500	58.60	57.40	62.80	59.60
Rolled				
1.563	57.00	55.70	....	....
1.625-2.000	56.30	54.90	....	57.50
2.125-2.500	54.80	53.40	....	....
2.563-3.375	53.20	51.70	....	....

Forging Stock: Round, Class 1, 45.20-58.60 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 50.50-66.60 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$19.40	2	$ 59.90
1	30.50	4	165.05
1¼	41.30	6	296.10
1½	49.40	8	445.55

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	60.60-64.80
12-14	45.70-47.20	61.30-65.80
15-17	45.90-47.90	62.50-67.50
18-20	46.50-48.30	64.50-70.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, .25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.50-14.00; old sheets, 10.50-11.00; borings and turnings, 6.50-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	50.13b	47.36c	....	50.32
Yellow Brass	44.02	32.30d	44.56	46.93
Low Brass, 80%	46.50	46.44	47.04	49.31
Red Brass, 85%	47.37	47.31	47.91	50.18
Com. Bronze, 90%	48.78	48.72	49.32	51.34
Manganese Bronze	52.01	46.11	56.61	....
Muntz Metal	46.39	42.20	....	....
Naval Brass	48.27	42.58	55.33	51.68
Silicon Bronze	54.76	53.95	54.80	56.74e
Nickel Silver, 10%	60.43	62.75	62.75	....
Phos. Bronze, A-5%	69.07	69.57	69.57	70.75

SCRAP ALLOWANCES f

	Clean Heavy	Rod Ends	Clean Turnings
Copper	23.000	23.000	22.250
Yellow Brass	17.375	17.125	15.750
Low Brass, 80%	19.500	19.250	18.750
Red Brass, 85%	20.250	20.000	19.500
Com. Bronze, 90%	21.000	20.750	20.000
Manganese Bronze	16.125	15.875	15.375
Muntz Metal	16.375	16.125	15.625
Naval Brass	16.125	15.875	15.375
Silicon Bronze	22.625	22.375	21.625
Nickel Silver, 10%	23.625	23.375	11.813
Phos. Bronze, A-5%	23.750	23.500	22.500

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, or any or all kinds of scrap, add 1 cent per lb.

7.00; crankcases, 10.50-11.00; industrial castings, 10.50-11.00.

Copper and Brass: No. 1 heavy copper and wire, 18.75-19.25; No. 2 heavy copper and wire, 16.75-17.25; light copper, 14.50-15.00; No. 1 composition red brass, 15.50-16.00; No. 1 composition turnings, 15.00-15.50; new brass clippings, 13.00-13.50; light brass, 9.50-10.00; heavy yellow brass, 11.50-12.00; new brass rod ends, 12.00-12.50; auto radiators, unsweated, 12.00-12.50; cocks and faucets, 12.50-13.00; brass pipe, 12.50-13.00.

Lead: Heavy, 8.50-9.00; battery plates, 3.50-3.75; linotype and stereotype, 10.25-10.75; electrotype, 9.25-9.75; mixed babbitt, 10.50-11.00.

Monel: Clippings, 30.00-32.00; old sheets, 29.00-30.00; turnings, 23.00-24.00; rods 30.00-32.00.

Nickel: Sheets and clips, 42.00-47.00; rolled anodes, 42.00-47.00; turnings, 40.00-42.00; rod ends, 42.00-47.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.50-17.50; 3003 clippings, 16.50-17.50; 6151 clippings, 16.00-17.50; 5052 clippings, 16.00-17.00; 2014 clippings, 15.50-17.00; 2017 clippings, 15.50-17.00; 2024 clippings, 15.50-17.00; mixed clippings, 15.00-16.00; old sheets, 13.50; old cast, 13.50; clean old cable (free of steel), 16.00-16.50; borings and turnings, 13.50-15.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 53.00; light scrap, 48.00; turnings and borings, 33.00.

Copper and Brass: No. 1 heavy copper and wire, 21.00; No. 2 heavy copper and wire, 19.00; light copper, 16.75; refinery brass (60% copper) per dry copper content, 18.75.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 21.00; No. 2 heavy copper and wire, 19.00; light copper, 16.75; No. 1 composition borings, 18.50; No. 1 composition solids, 19.00; heavy yellow brass solids, 13.25; yellow brass turnings, 12.25; radiators, 15.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 43.79; oval, 42.00, 5000-10,000 lb; electrodeposited, 35.75, 2000-5000 lb lots; cast, 36.25, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 10-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 111.50; 200-499 lb, 110.00; 500-999 lb, 109.50; 1000 lb or more, 109.00.

Zinc: Balls, 17.50; flat tops, 17.50; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.

Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30; f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 71.60; 300-900 lb, 69.60.

Copper Sulphate: 100-1900 lb, 14.55; 2000-5900 lb, 12.55; 6000-11,900 lb, 12.30; 12,000-22,900 lb, 12.05; 23,000 lb or more, 11.55.

Nickel Chloride: Less than 400 lb, 35.00; 400-9990 lb, 33.00; 10,000 lb, 32.50.

Nickel Sulphate: 5000-22,000 lb, 33.50; 22,000-35,900 lb, 33.00; 36,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.60; 200 lb, 25.90; 400 lb, 22.90; 1000 lb, 21.90; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 74.70; 100-600 lb, 65.80; 700-1900 lb, 63.00; 200-9900 lb, 61.20; 10,000 lb or more, 59.80.

Stannous Chloride (anhydrous): Less than 25 lb, 164.10; 25 lb, 129.10; 100 lb, 114.10; 400 lb, 111.60; 5200-19,600 lb, 99.40; 20,000 lb or more, 87.20.

Stannous Sulphate: Less than 50 lb, 126.90; 50 lb, 96.90; 100-1900 lb, 94.90; 2000 lb or more, 92.90.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page* 157)

ing in activity is aggravating the already depressed scrap market. Shipments have slowed to a standstill. Prices, though unchanged, are weak.

Seattle—The scrap market continues inactive. Sales are lacking and quoted prices are nominal. Receipts are light, prices being unattractive to collectors and generators. Turnover is reduced since mills are buying sparingly, having sizable stocks, and with holiday curtailments in prospect.

Steel Shipments Heavy

Mill shipments of finished steel products totaled 69,155,531 net tons in the first ten months this year, reports the American Iron & Steel Institute. That's nearly 400,000 tons more than the 68,755,943 shipped in the like 1956 period. It compares with the record 69,889,424 tons set during the first ten months of 1955.

Shipments to the automotive, construction, and railroad categories are running ahead of the 1956 ten-month totals. Construction, including maintenance, received more during January - through - October this year than the 10.4 million tons it received during all of 1956, and set a record for the period.

Plates, heavy structural shapes, and electrolytic tin plate are running ahead of the 1956 ten-month totals, and structural shapes are at a new ten-month high.

During October, total shipments of finished products were 6,555,690 net tons, compared with 6,171,674 in September and 7,930,957 in October, 1956.

Warehouse . . .

Warehouse Prices, Page 152

Rumors of price cutting in the warehouse market are circulating in the Pittsburgh district. Competition for business is particularly heavy in sheets, cold-drawn bars, and stainless steel. Demand is light for those products, and no sign of an increase in sales this month is noted. Sales are at the lowest level of the year in most flat-rolled products.

Yearend inventory reductions are causing a decline in demand for

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CLASSIFIED

Help Wanted

CLEANING ROOM SUPERINTENDENT: Must have supervisory experience and be completely familiar with all phases of cleaning room operations for a miscellaneous steel jobbing foundry producing castings up to 10,000 pounds. Excellent opportunity for an aggressive qualified man with a modern and progressive foundry located in the Middle West producing 600-700 tons per month. Advise full particulars including salary requirements. Box 603, STEEL, Penton Bldg., Cleveland 13, Ohio.

ENGINEER CAPABLE OF DESIGNING, stressing and drafting steel mill auxiliary equipment and devices. Should be able to start from original ideas and carry through to final installation, put them in production and train labor force. Three to five years experience in steel mills and workshop experience necessary. Write Box No. 627, STEEL, Penton Bldg., Cleveland 13, Ohio.

STEEL MILL SUPERINTENDENT for small plant consisting of electric furnace and Merchant Mill. Must have experience all phases. Southern location. Give complete account of experience, references and salary anticipated. Write Box 624, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Positions Wanted" set solid. 50 words or less $15.00, each additional word .30, all capitals, 50 words or less $19.20, each additional word .38; all capitals leaded, 50 words or less $23.40, each additional word .47. "Positions Wanted" set solid, 25 words or less $3.60, each additional word .14, all capitals, 25 words or less $4.50, each additional word .18; all capital leaded, 25 words or less $5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

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structural shapes and tin plate. Most tubular products are also on the downgrade for the same reason. Heavy plate sales continue fairly strong, as some mills are having difficulty with their delivery schedules.

Widespread curtailment in production schedules during the holiday period will further curtail demand, distributors predict. They look for some increase in demand early in the first quarter of 1958, although they expect present competitive conditions to continue.

Failure of a business pickup to materialize in the fourth quarter has prompted some distributors to cancel some orders on mills' books, especially for bars. In a few cases, December orders have been rescheduled for January.

Faced with a softening market for steel, distributors in the Los Angeles district have reduced prices on carbon steels. Buyers of less than 100 lb will receive a greater price differential percentagewise. This is the first across-the-board reduction in eight years.

Erle M. Jorgenson Co. is quoting $7.60 per 100 lb as the base for 20-ton steel plates, a drop from $8.40. On quantities of less than 100 lb, the base has dropped from $17.65 to $11.90. Similar reductions have been posted by other leading distributors in the area.

Distributors in the San Francisco district are holding the price line, although admittedly there is some uneasiness in the trade as a result of the price decline in southern California.

Canada . . .

Production of pig iron in Canada this year is ahead of that in 1956, but steel ingot and castings output will show a decline from last year's all-time peak. For the nine months ended Sept. 30, iron production was 2,910,901 net tons against 2,647,876 in the like 1956 period.

Stocks of pig iron at the end of September totaled 259,155 tons, compared with 225,128 at the end of August, this year, and 140,749 at the end of September, last year.

Output of steel ingots and castings in the first nine months this year totaled 3,947,287 net tons, compared with 3,945,058 in the like period of 1956.

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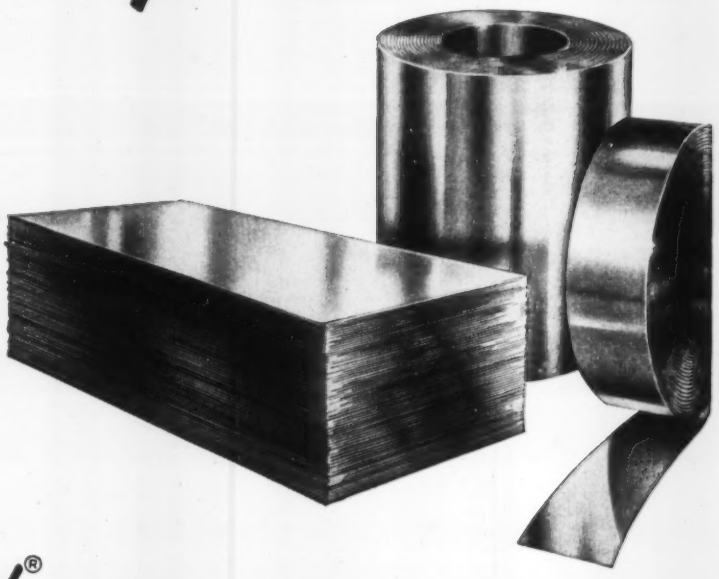

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